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Predicting personality disorders with the five-factor model of personality and other personality measures.

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PREDICTING PERSONALITY DISORDERS WITH THE FIVE-FACTOR MODEL OF PERSONALITY AND OTHER PERSONALITY MEASURES

by

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Abstract

A number of studies have explored in recent years the extent to which a dimensional view of Personality Disorders might be conceptualized in terms of the Five-Factor Model of Personality (FFM; Costa & McCrae, 1985; Goldberg, 1990). Moreover, other studies have suggested that interpersonal problems (Freedman et al., 1951), attachment style (Bowlby, 1977) and other personality constructs such as sociotropy vs. autonomy (Blatt, 1991; Beck, 1983) might also play a strong role in defining Personality Disorders. We have not, however, seen any studies to date that attempt to bring these two lines of thought together. In particular, no studies have attempted to explore the extent to which the interpersonal problems, attachment style, sociotropy vs. autonomy and the five personality dimensions together contribute to explaining Personality Disorders. The present study examines the FFM as a predictor of Personality Disorders while comparing it to other personality theories. Two measures of each personality theory were included in the study and the dependent variables were five components derived through a Principal Components Analysis of the two Personality Disorder measures (PDQ-4; Hyler et al., 1988; MCMI-III; Millon, 1994). Participants were 288 undergraduate students (49 males, 239 females) from a medium sized Canadian university who volunteered for partial course credit. The questionnaires were all administered via the Internet on a secure website. As predicted, the other personality measures captured significant variance above and beyond the FFM. Both measures of sociotropy vs. autonomy and of attachment theory accounted for significant amounts of unique variance for each of the five Personality Disorder components. The results and discussion centre on the description of the findings and a comparison and interpretation of the role each measure played in the explaining the common variance within and between the Personality Disorder measures.

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There is growing evidence that the five-factor model of personality (FFM) provides a considerable amount of information with regards to the assessment of personality disorders that is both clinically and empirically useful (Costa & McCrae, 1992; Harkness, McNulty, & Ben-Porath, 1995; Klein, 1993; Morey, et al., 2000;Widiger, et al., 1994). While the FFM is considered to be an adequate independent tool when used to identify and define these disorders, some (i.e., Widiger & Trull, 1992) have argued that it fails in its attempts to properly define the construct of personality psychopathology as a whole and does not properly account for all of the variance present within and among these disorders. Many theorists (i.e., Coolidge et al., 1994; Perris, 1999) also suggest that the FFM lacks as a model of personality disorders because it does not provide a theoretical foundation from which to formulate etiology, treatment implications, or even prognosis. These theorists argue that constructs derived from the study of personality more generally as opposed to those derived from a natural language lexicon (as was the FFM), should have at least as strong a role in predicting personality disorder classification and may prove to be of added clinical or empirical utility.

Other theories of personality have been postulated to describe the core constructs of personality disorders and/or their development. These include the dimensions of interpersonal style (warmth and dominance), attachment style, and other models of personality such as dependency and self-criticism, or sociotropy vs. autonomy. It is currently unclear whether, or to what extent these aspects of personality would increment the prediction of personality disorders compared to measures of the FFM and the nature of the relation between each. Thus, these other theories of personality should be investigated in terms of their capacity for better accounting for personality disorder variance compared to the FFM.

Personality disorders are typically defined as constellations of character traits and patterns of behaviour that are persistently maladaptive and lead to difficulties in functioning in interpersonal settings (APA, 1994). Maladaptive behaviour can be construed as inflexible responses to a changing environment and the perpetuation of behaviours that exacerbate preexisting difficulties as well as a lack of resilience when faced with a stressful situation (Millon & Davis, 1995).

Currently, Axis II of the DSM-IV defines 10 different disorders to classify different patterns of maladaptive behaviour (APA, 1994). However, Axis II has been criticized for having poor precision and testability as well as little empirical validity (Westen & Arkowitz-Westen, 1998). There is also extensive evidence of diagnostic comorbidity among these disorders making it difficult to classify individuals with these disorders (Clark, Watson, & Reynolds, 1995).

As such, researchers have attempted to properly assess personality disorder by studying personality in its entirety, and by assuming that personality disorders are merely extreme cases of normal personality traits. Thus, many researchers believe that the components (traits) of personality disorders are dimensional in nature and are all present in normal people. They are merely accentuated in a maladaptive fashion in individuals diagnosed with personality disorders (Costa & McCrae, 1990; John, Angleitner, & Ostendorf, 1988; Morey, Gunderson, Quigley, & Lyons, 2000).

However, while the FFM has accumulated considerable empirical support as a comprehensive model for understanding personality (Widiger & Costa, 1994), numerous studies (i.e., Coolidge et al., 1994; Harkness & McNulty, 1994; Reynolds & Clark, 2001) have demonstrated that the FFM fails to properly incorporate many aspects of personality psychopathology believed to define many of the personality disorders.

Purpose of this study

The purpose of this study is to test empirically whether measures drawn from three different personality theories can explain significant incremental variance in personality disorders above and beyond what the FFM can explain.

In order to test this hypothesis, three main theories pertaining to personality psychopathology will be explored to determine if and what kind of information they might provide when used to account for personality disorder variance over and above that accounted for by the FFM. The three main theories explored are that of sociotropy vs. autonomy (Beck 1983; Blatt, 1991), interpersonal theory (Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1988; Wiggins, Trapnell, & Phillips, 1988), and attachment theory (Bowlby, 1977). It is hoped that once the relation between these various theories is determined and their value in identifying and describing the underlying constructs of personality psychopathology is ascertained, attempts can later be made to create a more comprehensive model.

The goal of this exploratory study is to determine whether there are personality constructs, perhaps specific to personality psychopathology, that remain insufficiently defined by the FFM but may be captured by measures of other personality theories such as those of sociotropy vs. autonomy, interpersonal traits and problems, and attachment styles.

The Five-Factor Model

According to the trait theory of personality, the construct of personality is believed to contain a specific number of dimensions that, once identified, can be used to accurately describe the characteristics of any individual (Digman, 1994). Dimensional models are created based on the theory that the latent construct of personality can be accurately

described using the lexical approach (Digman, 1994). This approach is based on the assumption that all socially relevant and remarkable personality characteristics would have been encoded into language and can therefore be uncovered by analyzing language (John et al., 1988). Once a comprehensive lexicon of traits and behaviours is created, it is subjected to factor analysis to identify the independent constructs of which personality is comprised.

Of primary interest should be the development of a model that fully and accurately describes the personality construct. Independent researchers have developed models using the lexical approach and have repeatedly come up with five fundamental factors that sufficiently account for all facets of personality (Thurstone, 1934; Tupes & Christal, 1992). According to Morey and colleagues (2000, p.205), such models provide an "overarching taxonomy of personality characteristics that permit a systematic classification of the thousands of personality attributes found in the language of scientific and lay personality descriptors."

Earlier researchers obtained factor analysis ratings of individual differences in order to better understand Spearman's *g* and later to identify the constructs of normal personality (Digman, 1994). The first group to embark on the task of organizing personality-related terms in the dictionary was Allport and Odbert (1936). From the 550,000 words they found in Webster's New International Dictionary, they constructed a list of 18,000 personality-related terms. Inclusion of a term was based on whether it could "distinguish one human being from another." These words were then categorized into one of four columns. One of the columns included all of the terms they considered to be "personality traits."

Taking the torch from Allport and Odbert, Cattell, whose main interest was

discovering the major dimensions of personality, focused on reducing the Allport and Odbert's trait column to a more manageable size (Cattell, 1947). Once Cattell succeeded in factor analysing the traits, he concluded that there were 12 primary personality factors. Although Cattell claims to have used only "blind, mathematical criteria" to create his clusters, some believe that his variables and factors represented traits that he felt were important (John et al., 1988).

It was McDougall who first proposed that personality might be described using five broad factors (1932, see Digman 1994). Thurstone (1934, see Digman 1994), using 60 adjectives, also found that these adjectives could be factor analyzed into five similar factors. Cattell's work stimulated many researchers to attempt to replicate his findings. Fiske (1949), using 22 of Cattell's variables, also found only five factors.

Using an American Air Force sample, Tupes and Christal (1961) factor analyzed Cattell's 30 bipolar scales and they too were unable to find evidence for any more than five factors. They labeled their factors Surgency, which included descriptors like talkative, assertive, and energetic; Agreeableness, which included adjectives such as good-natured, cooperative, and trustful; Dependability, which included adjectives such as conscientious, responsible, and orderly; Emotional Stability, which included characteristics such as calm, not neurotic, and not easily upset; and finally, Culture, which included trait descriptors such as intellectual, cultured, polished, and independent-minded.

Currently, most personality researchers perceive the FFM as consisting of five factors or fundamental traits believed to provide a reasonably comprehensive description of personality. As such, the FFM has received considerable empirical validation as a model of normal personality (e.g. Costa & McCrae, 1985; Westen, 1995; Widiger & Trull, 1997).

One version of the FFM is the NEO-PI-R (Costa & McCrae, 1985), which is the most widely used measure developed to assess personality using five-factors and can also be further subdivided into 30 facets, six per factor. The five-factors, as delineated by Costa and McCrae (1985, 1991), are Neuroticism, Extraversion, Agreeableness, Conscientiousness and Openness to Experience. Each of the broad domains can also be further differentiated into their underlying facets (Costa & McCrae, 1995). The Neuroticism factor reflects an individual's level of emotional stability. Neuroticism involves a characterological disposition to experience negative affectivity such as anger, depression, anxiety, guilt, disgust, shame, and embarrassment (Costa and McCrae, 1992). As such, the underlying facets of Neuroticism are Anxiety, Angry Hostility, Depression, Self-Consciousness, Impulsiveness and Vulnerability (Costa and McCrae, 1995). Extraversion is the dimension related to an individual's tendencies to be sociable, assertive, energetic, and experience positive emotions. The facets of this dimension include Warmth, Gregariousness, Assertiveness, Activity, Excitement-Seeking, and Positive-Emotions. Openness to Experience is the third factor and pertains to the disposition to be curious, imaginative, and unconventional (Costa & McCrae, 1992). Individuals who score high on this factor are often described as creative but may also be described as unusual. Agreeableness is the fourth dimension related primarily to an individual's interpersonal disposition. According to Costa and McCrae (1992c), an individual high in this domain tends to be altruistic, cooperative, and easy-going. The last dimension, Conscientiousness, is considered to assess an individual's degree of organization, persistence, and motivation in goal-directed behaviour.

Goldberg's "Big Five"

In an attempt to replicate the five-factor model or "Big Five" as he chose to call it, Goldberg (1990) constructed an inventory of 1,700 trait adjectives using a revised list of personality descriptors. He then asked participants to rate their personality according to these adjectives. Goldberg was able to replicate the "Big Five" using factor analysis. The same factors appeared even when the five factors were rotated (Goldberg, 1990). Saucier and Goldberg (1996) later used a more abbreviated set of adjectives and again managed to replicate the "Big Five." Goldberg continued to publish lists of trait adjectives containing adjectives that uniquely define each of the "Big Five" factors. The most commonly used is a list of 100 unipolar trait descriptive adjectives that are rated on an eight-point scale. Saucier and Goldberg (1996) argued that while phrases and sentences may better describe fundamental attributes (as used for the NEO-PI-R; Costa & McCrae, 1985), adjectives provide an advantage for two reasons: the fundamental lexical hypothesis focuses on words, not on sentences, and because single-word descriptors comprise a finite domain, offering a good rationale for variable selection when developing a model.

If personality traits are in fact encoded into the natural language, the existence of a similar personality taxonomy across different cultures and languages would provide support for the lexical model. Using Goldberg's trait descriptive adjectives, Hofstee, Kiers, de Raad and Goldberg (1997) made attempts to uncover factor markers for the "Big Five" in several different cultures and languages. Hofstee and colleagues (1997) were able to relatively reconstruct his five factors across four languages, although they found that Openness to Experience did not properly replicate in the Dutch language. Hofstee and colleagues (1997) noted that many of the different loadings at the facet level occurred because few trait terms have precise translations and there is variability in meaning.

The FFM and its relation to Personality Disorders

The NEO-PI-R, and its five broad-based domains, has also garnered considerable empirical support and is thought by many researchers to be a useful alternative to the DSM-IV Axis II Personality Disorder system (Widiger, 1998). Widiger and Trull (1992) proposed that the NEO-PI-R is also applicable to personality psychopathology and it is now being considered as a possible replacement model for Axis II in the upcoming DSM-V. They propose that personality disorders are "maladaptive extreme variants of the five basic factors of personality" and that personality disorders can be characterized by different extreme elevations of the five factors (p. 372; Widiger & Trull, 1992).

Assuming that abnormal personality reflects quantitative differences in the manifestation of extreme personality traits, then adopting a measure of normal personality should prove effective in the assessment of personality psychopathology (Wiggins & Pincus, 1994). However, if there is a qualitative difference between disordered personality and normal personality, then the use of a dimensional measure may be insufficient to properly conceptualize and accurately identify a personality disorder (Benjamin, 1996; Perris, 1999; Wiggins & Pincus, 1994).

The FFM, while lacking a theoretical basis, is considered by its proponents to be a well-rounded model of both normal and abnormal personality since it provides information including adjustment and stability (Neuroticism), interpersonal style (Extraversion and Agreeableness), and the capacity for goal directed behaviour (Conscientiousness). These dimensions may be sufficient to characterize personality disorders.

McCrae, Yang, Costa and colleagues (2001) tested the hypothesis that personality trait profiles may be particularly useful for identifying individuals with personality

disorders. These authors proposed that if personality disorders represent integral syndromes of traits, each should show a characteristic personality profile. They found that the correlations between NEO-PI-R (Costa & McCrae, 1992c) profiles and PDQ-4 (Hyler, 1994) continuous scores ranged from .23 to .60 with a median value of .41. These results suggest that profiles combining the five "normal" personality dimensions of the five-factor model account for a considerable amount of variance within the current conceptualization of personality disorders. The authors also found that when using diagnostic interviews, the profiles derived from the NEO-PI-R predicted personality disorder diagnoses about as well as did the PDQ-4 with median kappas of .13 vs. .11 respectively (McCrae et al., 2001).

Recently, with the looming advent of DSM-V, many researchers have sought to test the utility of the FFM as a model for personality disorders. Wiggins and Pincus (1989) found that the FFM did an adequate job of explaining the common variance in the measure of personality disorders using the MMPI Personality Disorder scales (MMPI-PD; Hathaway & McKinley, 1967) and the Personality Adjective Check List (PACL; Strack, 1987). They found that the dimensions of Extraversion and Neuroticism are strongly implicated in the conceptualization of personality disorders as represented by the PCLR and the MMPI-PD. They also showed that all personality disorders could be differentiated by their loading on the various FFM domains.

Trull (1992) also included a measure of the FFM in a multi-measure study of personality disorders. Trull found considerable support for the FFM including significant positive correlations between Neuroticism and Obsessive-Compulsive, Dependent, Borderline and Avoidant Personality Disorders. Negative relationships were found between Extraversion and the Schizoid and Avoidant Personality Disorders. Positive

relationships were found between Extraversion and the Histrionic and Narcissistic Personality Disorders. Negative associations were found between Agreeableness and Paranoid and Antisocial Personality Disorders. Negative relationships were also found between Conscientiousness and Antisocial Personality Disorder.

Dyce and O'Connor (1998) examined Widiger and colleagues' (1994) facet interpretation of the personality disorders (where patterns of prototypes of scores were developed to represent each personality disorder) and found that 63% of these predictors were supported using a sample of college students. Lynam and Widiger (2001) asked clinicians to rate prototypical cases of the DSM-IV personality disorders using the FFM and found that there was a very high rate of agreement between the raters. The authors concluded that, with the possible exception of Schizotypal, the DSM-IV Personality Disorders can be understood from the perspective of the FFM. However, McCrae, Yang, Costa and colleagues (2001) also found when using a structured interview as a measure of diagnosing personality disorders that, while the NEO-PI-R explained significant variance independently, when combined with the PDQ-4 (Hyler, 1994), an additional 1% to 18% of the variance was accounted for, depending on the personality disorder. This finding may indicate that the FFM is limited in its ability to account for some aspect of the personality disorder construct. Using the FFM to predict individual personality disorders, Reynolds and Clark (2001) found that FFM composite scores accounted for a significant proportion of the variance in all but two of the 13 personality disorders, Schizotypal and Obsessive-Compulsive (this included all ten personality disorders, Personality Disorder Not Otherwise Specified, and the two research disorders being considered for future inclusion in DSM-V; APA, 1994). They reported a mean R^2 value of .27 with a range from .07 for Schizotypal to .51 for Depressive Personality Disorder.

Problems With The FFM As a Model Of Personality Disorders

Many researchers argue that the FFM was originally developed as a measure of 'normal' personality and thus it may not adequately assess personality psychopathology (e.g., Harkness, McNulty & Ben-Porath, 1995). Some researchers have claimed that certain maladaptive personality traits are not adequately represented by the FFM, while other dimensions of the FFM have no relevance to personality disorders (i.e., Clark et al., 1993; Harkness, 1993). Tellegen (1993) stated that many of the concepts that are important in the assessment of personality psychopathology were underrepresented in the development of the five-factor model. Block (1995) criticized the lexical hypothesis and its statement that personality can be described using laypersons adjectives, stating that laypersons cannot be considered expert evaluators and describers of the crucial features of personality. Butcher and Rouse (1996) reported that Allport and Odbert believed that affect-laden and evaluative terms were inappropriate for the scientific study of personality and excluded such terms from their original list of trait terms. When both affective terms and evaluative terms were used to construct a lexicon of trait terms, several researchers found that seven factors were required to account for the variance. Of these seven factors, five bear some resemblance to the current FFM. The two factors that could not be absorbed into the FFM were Positive Valence, which is conceptualized as a continuum from Excellent to Ordinary, and Negative Valence, which is conceptualized as a continuum from Decent to Cruel (Tellegen, 1993; Waller & Zavala, 1993). Other researchers have also extended their lexicon to include more "scientific" terminology and found a sixth factor coined "Honesty" which is comprised of terms including "Machiavellianism" and "Adroitness," terms that would likely not be found in the average layperson's vocabulary (Ashton, Lee, & Son, 2000; Ashton & Lee, 2001). To this end,

Harkness and colleagues (Harkness, 1992; Harkness & McNulty, 1994; Harkness, McNulty, & Ben-Porath, 1995) embarked on a program of research that eventually resulted in the development of the Personality Psychopathology Five (PSY-5). They were able to assemble a set of scales extracted from the Minnesota Multiphasic Personality Inventory, version two (MMPI-2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) to measure its personality constructs. They determined that the Psychoticism factor from the PSY-5 model of personality psychopathology effectively measures a component of psychopathology apparently lacking in the FFM (Harkness & McNulty, 1994). Harkness and McNulty (1994) contend that the FFM does not accurately measure personality psychopathology because its developers did not adequately select lexical terms that accurately depict behaviours and traits characteristic of personality disordered individuals; that the selected lexicon was incomplete. While most FFMs were developed based on normal personality, the PSY-5 was created using extreme personality traits and personality disorder symptoms. For example, the PSY-5 includes markers pertaining to cruel and violent behaviours while the NEO-PI-R only addresses low-agreeableness as defined by someone who is cold and harsh (Harkness & McNulty, 1994). There is also evidence that all five factors of the FFM may not be relevant for the assessment of personality psychopathology (Coolidge et al., 1994). The fifth factor, Openness to Experience, while pertaining to unusual cognitions and beliefs, does not contribute to the differentiation of any of the disorders, particularly Schizoid and Schizotypal (Reynolds & Clark, 2001).

Researchers have also questioned the clinical and empirical utility of such a model, stating that the FFM may be too broad to accurately and parsimoniously discriminate among the personality disorders (Block, 1995; Young et al., 1993). It also

seems that the FFM tends to find similar patterns using facet-level interpretations across all of the personality disorders, failing to provide adequate differentiation among the various disorders (Cloninger & Svrakic, 1994; Zweig-Frank & Paris, 1995). Other researchers have also argued that the FFM may not adequately describe abnormal personality (Butcher & Rouse, 1996; Clark, 1993; Coolidge et al., 1994; Davis & Millon, 1993).

Furthermore, while a trait-based approach can provide an adequate description of the personality disorders, Klein (1993) also posited that theory-based assessments might be more reliable than purely descriptive approaches due to the structure provided. Theory-based models would also provide information regarding etiology and patterns of comorbidity and can help select appropriate treatments and better estimate prognosis.

Sociotropy and Autonomy

Another line of personality research has emphasized dimensions pertaining to individual differences in both interpersonal and individualistic desires and behaviours. Both Blatt (1991) and Beck (1983) have conceptualized two overarching dimensional traits independently as being fundamental to the description of personality and personality psychopathology. Blatt (1991) proposed that every individual is divided in their dominant goal orientations whether it be in terms of Self-Criticism, a trait associated with achievement expectations and the need for independence, or in terms of Dependency, which pertains to a need to feel a sense of communion with others and thus to a sense of interpersonal dependency and a strong need for affiliation. Beck (1983) proposed two constructs similar to those posited by Blatt. His constructs, coined Sociotropy and Autonomy, are dimensional traits ranging from little need for affiliation and achievement to strong, and perhaps pathological, needs. Autonomy closely resembles Blatt's Self-

Criticism and Sociotropy resembles Dependency although there is more congruence between the former than the latter (Robins, Ladd, Welkowitz, Blaney, & Kutcher, 1994). A considerable amount of research has linked both of these personality styles to the development of different forms of depression (Blatt & Zuroff, 1992; Beck, 1983). Blatt (1991) posited that psychopathology might result when either of these two dimensions of personality are experienced in extreme form and lead to maladaptive behaviours in coping. Specifically, Blatt (1991) proposed that introjective (Self-Critical) psychopathologies lead to distorted attempts at obtaining an effective concept of self such as might occur in individuals with Paranoid, Obsessive-Compulsive, and Narcissistic Personality Disorder diagnoses. Anaclitic (Dependent) psychopathologies, on the other hand, pertain to the excessive desire to maintain satisfying relationships and relate to features of Dependent, Histrionic and Borderline Personality Disorders. Ouimette and colleagues (1994) found that both Dependency and Self-criticism were significant predictors of personality disorder diagnoses. Two valid and reliable measures have been developed to measure both of these proposed constructs, the Depressive Experiences Questionnaire (DEQ; Blatt, D'Afflitti, & Quinlan, 1976) and the Personal Style Inventory (PSI; Robins, Ladd, Welkowitz, Blaney, & Kutcher, 1994). However, several concerns were raised regarding the stability of these various measures in the context of depressed mood (Coyne & Whiffen, 1995). To address this concern, Robins and colleagues (1994) developed the revised version of the Personal Style Inventory (PSI-II) by altering the items so that they did not reflect Axis I symptomatology.

Interpersonal style

While dimensional models of personality will provide a considerable increase in the empirical validity and the clinical utility of personality disorder assessment, they fail

to provide important interpersonal and etiological information that many clinicians and researchers believe are essential for the diagnosis of personality psychopathology. In one study, Westen (1997) reported that most clinicians do not find that direct questioning based on DSM-IV criteria is useful for the diagnosis of personality disorders. He argued that most clinicians make Axis II diagnoses by listening to their patients describe their interpersonal interactions and by observing how they interact with the interviewer. Thus, including an interpersonal component to a standardized set of diagnostic tools for the assessment of personality psychopathology would provide clinical utility as well as motivate many clinicians to use more empirically derived tools.

Perris (1999) suggests that *personality-related disorders of interpersonal behaviour* is a more appropriate term for the long-standing psychopathology currently identified by Axis II. He and other researchers stress the importance of emphasizing the interpersonal component of these disorders since they appear to be a fundamental component of personality psychopathology (Perris, 1999; Widiger & Hagermoser, 1997).

Overholser (1989) distinguished between personality traits and personality disorders by specifying that personality psychopathology occurs when individuals' personality traits are inflexible and maladaptive and cause significant impairment in social or occupational functioning. Furthermore, he stressed that interpersonal measures may provide a more complete description of typical behaviour patterns as opposed to the dichotomous responses obtained when using a categorical system.

Klein (1993) encouraged the integration of interpersonal theory into the study of personality disorders. His main argument is that this approach can help provide hypotheses about etiology, dynamics and, treatment. He further stressed that the interpersonal dimensions in the circumplex models are theoretically linked to the role of

early family relationships and social learning as the context for the development of interpersonal traits. Also, interpersonal theory can help illuminate the interpersonal context within which the personality disorders become manifest.

Due to the fundamental role that interpersonal relations play in the definition of personality psychopathology, many researchers have attempted to create models of personality psychopathology using the interpersonal circumplex (Kass et al., 1985; Hyler & Lyons, 1988; Romney & Byrner, 1997). The interpersonal circumplex is a two-dimensional structural representation of interpersonal traits (Wiggins, Trapnell, & Phillips, 1988). The Wiggins's (1979) circumplex model was founded on the interpersonal system of personality assessment proposed by Freedman, Leary and their colleagues (1951). This model contains eight subscales, which together define two orthogonal axes, love-warmth-affiliation or nurturance (horizontal) and dominance-status-control or dominance (vertical). Any interpersonal trait can be interpreted as a particular blend of these two dimensions with a corresponding angular location on the circle. Wiggins and Pincus (1989) used two measures of personality disorders, one developed using DSM-III criteria, the MMPI-PD scale (Morey et al., 1985) and the second is the PACL, developed from Millon's theory of personality psychopathology (Strack, 1993). They plotted the various personality disorder scales from each of the two personality disorder measures and found that there were at least two disorder scales in each of the four quadrants, suggesting that a broad range of interpersonal dispositions can be found within personality disorders as outlined by the two personality disorder measures. The researchers found that Histrionic Personality Disorder fell into the first quadrant (Dominant-Warm); Narcissistic and Antisocial Personality Disorders fell into the second quadrant (Dominant- Cold-Hearted); Schizoid and Avoidant Personality Disorders fell

into the third quadrant (Submissive-Cold-Hearted); and Dependent Personality Disorder fell into the fourth quadrant (Warm-Submissive). Although scales with the same labels from the PACL and MMPI tended to fall in the same quadrants, there was considerable variability in the extent to which their angular locations and communalities differed within a quadrant.

O'Connor and Dyce (1998) reviewed studies attempting to plot the personality disorders on the interpersonal circumplex and found variable support for a circumplex configuration of personality psychopathology. However, they noted that many of the personality disorders do have notable projections in interpersonal space. Researchers have found evidence of interpersonal circularity for five of the personality disorders namely: Schizoid, Paranoid, Narcissistic, Dependent, and Histrionic Personality Disorders (Kass et al., 1985; Hyler & Lyons, 1988; Romney & Byrner, 1997). These findings indicate that perhaps interpersonal style is only meaningful for a subset of personality psychopathology. However, the interpersonal circumplex is not, on its own, useful for distinguishing between and properly describing the personality disorders. Most interpersonal models have failed when attempting to describe individual personality disorders with single points on the circumplex; using the DSM trait descriptors of the Personality Disorders lead to clustering of the Personality Disorders on the circumplex (Dyce & O'Connor, 1998; Klein, 1993).

Benjamin (1993) argued that the Personality Disorders are not quantitatively different from normal measures of personality and interpersonal style but require a more complex and qualitative approach in order to best describe them. Her interpersonal model, the Structural Analysis of Social Behavior (SASB; Benjamin, 1974, 1993), a model of interpersonal style, is composed of three perpendicular dimensions (unlike other

interpersonal models composed of only two dimensions), which she believes provide a more comprehensive description of personality psychopathology. This model has, however, been criticized for failing to include the affective and attitudinal components considered to be core aspects of personality psychopathology (Widiger & Hagermoser, 1997; Wiggins, 1994).

When the interpersonal circumplex and the FFM were compared through a joint factor analysis of the NEO-PI and the IAS, it was discovered that the dimensions of the interpersonal circumplex (Dominance and Affiliation) closely resemble two of the factors in the FFM (Extraversion and Agreeableness) and that the interpersonal circumplex can be replicated by the two FFM dimensions of Extraversion and Agreeableness (McCrae & Costa, 1989). Wiggins later extended his interpersonal adjectives scale (IAS-R) to include adjective measures for the other three of the "Big Five" factors (Trapnell & Wiggins, 1990).

Attachment theory

According to Bowlby (1977) attachment is the strong, long-lasting bond that we develop towards significant others in our lives characterized by the proneness to seek and maintain proximity to these important others in order to obtain protection and security. Bowlby (1977) proposed that an internal working model of attachment is developed as an infant progresses through four phases. Depending on the response of the infant's caregiver(s), a child develops a particular internal working model or set of expectations about the availability of caregivers, their likelihood of providing support during stressful events, and how they will interact with these attachment figures. Security of attachment is considered to be the attachment style characteristic that best predicts adult social

adjustment and that is believed to have significant implications for the development of personality psychopathology (Berman & Sperling, 1994).

Four different attachment styles have been identified which predict later interactional styles with significant others. Bartholomew and Horowitz (1991) adapted the attachment styles described in infants and combined results from studies using both interview and self-report measures to create a two-dimensional model to identify the four attachment types. These four types are determined based on whether an individual's self-image and their perception of others are positive or negative. These types are Secure, Preoccupied, Fearful, and Dismissing.

The Secure type is comfortable with intimacy and autonomy and has a positive view of the self and others, while the Preoccupied type has a negative view of the self but a positive view of others and is thus preoccupied with gaining the acceptance of others in order to find self-worth. The Fearful type has both a negative view of the self and of others, and finally, the Dismissing type has a positive sense of self but a negative view of others (Bartholomew & Horowitz, 1991).

Bowlby (1977) maintains that attachment theory can be used to frame hypotheses regarding the etiology of certain disorders by exploring early family experiences. He proposed that attachment is an important determinant of personality, both normal and disordered.

Attachment style may provide information regarding the etiology of personality psychopathology that is lacking in the current model of the Personality Disorders. The DSM-IV Personality Disorders are not grouped, for the most part, according to a theoretical model. Disorders tend to be organized based on symptomatology, largely ignoring the shared etiological components of disorders with, in some cases, widely

differing symptomatology. Andreasen and Carpenter (1993) emphasized the need to identify the underlying etiological mechanisms as the primary means of classifying disorders in order to both help understand the disorders and hopefully eliminate group heterogeneity. Furthermore, there is considerable evidence that adult attachment style correlates significantly with many of the main criteria that are used to identify the Personality Disorders (Feeney & Noller, 1990). Insecure attachment has been found to be a characteristic component of both Avoidant and Dependent Personality Disorders (Trull, Widiger & Frances, 1987). The results of another study suggest that attachment difficulties are associated with Cluster B personality traits and that less secure attachment in general is associated with Histrionic, Narcissistic, Antisocial and Borderline Personality Disorders (Bender, Farber, Barry, & Geller, 2001). Other links between attachment and personality have also been shown. Shaver and Brennan (1992) found a moderate correlation between attachment style and Neuroticism, Extraversion and Agreeableness. Feeney and Noller (1996) interpreted this finding to indicate that attachment style is not redundant within the basic dimensions of personality, but provides additional information regarding how an individual relates to others and that it makes a unique contribution to the study of individual differences.

Recently, researchers have begun to explore the relation between interpersonal facets of personality and various attachment styles (Bartholomew & Horowitz, 1991). The results of these studies have suggested that the largest dimension of self-reported attachment is co-ordinate with interpersonal dominance as defined by the gregarious-extraverted and aloof-introverted octants of the interpersonal circumplex. Moreover, other studies have suggested that interpersonal difficulties in the context of attachment style play a strong role in defining personality psychopathology (Perris, 1999; Brennan &

Shaver, 1998; Birtchnell, 1997). Feeney and Noller (1996) described personality psychopathology as resulting from a failure to make stable attachments that can lead to identity diffusion and to relationship and social problems in adult life. Perris (1999) attempted to develop a theoretical model of personality psychopathology using a deconstructionistic approach by dismantling and recombining various theoretical models of personality psychopathology into a unified whole in order to develop the most comprehensive model. His model includes many interpersonal components and pulls considerably from dynamic, object-relations and Bowlby's (1969) attachment theory.

Hypotheses

It is hypothesized that while the FFM has a significant relation with the Personality Disorders, additional measures, included based on alternative theories of personality psychopathology, will capture personality disorder variance beyond that accounted for by the FFM as well as provide information that may be more clinically useful, empirically sound, and will help to better operationalize the construct of personality psychopathology.

Considering that this is an exploratory study, specific hypotheses cannot be made regarding the amount of personality disorder information that each individual measure will provide. It is postulated, however, that combining these measures with the FFM will create a model that will capture significantly more variance in the Personality Disorder construct(s) than the FFM alone.

The domains of Sociotropy and Autonomy are personality styles related to the FFM (Dunkley, Blankstein, & Flett, 1997), but are not fully accounted for by the model possibly because they provide an added measure of more abnormal personality characteristics, particularly when using the DEQ (Blatt, D'Afflitti, & Quinlan, 1976). It is

further postulated that while the dimensions operationalized by the PSI-II (Robins, et al., 1994) conceptualization of these traits may provide a more parsimonious measure of personality psychopathology, the DEQ dimensions will account for variance in the Personality Disorders above and beyond what is accounted for by the FFM.

While it is possible to also account for most interpersonal information using the FFM (Widiger & Hagemoser, 1997), incorporating interpersonal measures into the assessment of personality disorders may negate the need for a number of the FFM factors or may provide a more parsimonious method (explaining more variance using fewer factors) for accounting for personality disorder variance.

Attachment measures also have some overlap in terms of construct measurement with interpersonal measures and the FFM. However, it has been demonstrated that the relation between these measures is moderate at best. Thus, it is hypothesized that attachment measures will also be able to account for some of the variance unaccounted for by the FFM.

Method

Participants

Participants were 49 male and 239 female undergraduate students (for a total sample size of 288) at the University of Windsor in Ontario, Canada. Participants were randomly recruited through a participant pool comprised of students in undergraduate psychology courses offered at the university. Participants obtained partial course credit for participating in this study. A randomly selected sample of university students was chosen for this study as opposed to a clinical population in order to obtain as much variability as possible in terms of personality profiles and possible diagnoses. Previous researchers have found that about 25% of college students meet criteria for at least one personality disorder diagnosis using self-report questionnaires (PDQ-R; Dolan, Evans, & Norton, 1995; Xiufen, Yueqin, & Liming, 2000).

The sample size was deemed adequate for the use of both Principal Components Analysis (PCA) and Multiple Regression Analysis as Tabachnick and Fidell (2001) suggest a minimum of 5 subjects for every variable entered into a PCA (there were twenty variables) and suggest a minimum of $N \geq 50 + 8m$, where m is the number of independent variables. In this case, 23 independent variables were used (the subscales for all eight measures) requiring a minimum sample size of 234. Thus, the sample size of 288 was deemed adequate for this study for both the data-reduction part and the multiple regression part of the analyses.

The mean age of the participants was 22.9 years (SD = 5.7) ranging from 17 to 59, and there was a significant difference in age by gender $t = 3.58$, $p < .001$. The mean age for the males in the sample was 25.5 (SD = 8.3) and the mean age for females in the sample was 22.4 (SD = 4.8). From the sample, 171 (59.4%) participants described

themselves as Caucasian or White; 16 (5.6%) as African, Caribbean or Black; 12 (4.2%) as East Indian or South Asian; 6 (2.1%) as Arabic; 13 (4.5%) as Asian; 38 (13.2%) as European; 19 (6.6%) as Canadian; 12 (4.2%) reported another ethnicity; and one participant refused to answer the demographic questions. Most of the students, 248 (86.1%), described themselves as single, while 20 (6.9%) as married, 14 (4.9%) as common-law and 6 (2.1%) as divorced. Almost half of the participants 121 (42.0%) were in their first year of university, 54 (18.8%) were in their second year of university, 34 (11.8%) were in their third year of university and 47 (16.3%) were in their fourth year of university and 31 (10.8%) reported having attended college.

Measures

The study has intentionally incorporated two measures of each construct for a total of ten personality related questionnaires and a demographics questionnaire. These are described below.

Personality Disorder Measures. These are the Personality Diagnostic Questionnaire 4 (PDQ-4) and the Millon Clinical Multiaxial Inventory, version three (MCMI-III).

The Personality Diagnostic Questionnaire 4 (PDQ4; Hyler et al., 1988) is the most current version of this well validated scale for assessing the Personality Disorders in the DSM-IV. It consists of a 99 item, self-administered true/false questionnaire designed to yield diagnoses consistent with the DSM-IV (APA, 1994). The items in this questionnaire correspond to individual criteria and the instrument yields both dimensional and categorical scores. The PDQ-4 has demonstrated internal consistency coefficients ranging from .46 to .74 for the 11 personality disorders. This measure has also been validated as a self-report personality disorder diagnostic tool through comparisons with structured personality disorder interviews. Fossati and colleagues (1998) reported significant,

although somewhat low, correlation coefficients between the PDQ-4 scales and the SCID-II (Structured Clinical Interview for the DSM-IV AXIS II Personality Disorders) with correlations ranging from .19 to .42. Overall, the PDQ-4 scales showed significantly higher scores than the structured interview.

The Millon Clinical Multiaxial Inventory-III (MCMI-III; Millon, 1994) is a comprehensive assessment device of the major forms of Axis II psychopathology. The development of the MCMI used a combination of rational theory-based as well as empirical procedures (Groth-Marnat, 1997). The development was guided by Millon's theory of personality that states that personality can be described using the polarities of pleasure-pain, active-passive and self-other (Millon & Davis, 1996). An important feature of this measure is that personality disorders are not considered to be mutually exclusive; as such many of the scales can be expected to be highly correlated (Groth-Marnat, 1997). However, the MCMI-III was developed for use with psychiatric patients and is not normed using a normal population (Millon, 1994). Base-rate scored are used to place a person's score into a personality disorder category. This measure has been widely validated and is extensively used in clinical settings. Studies of the internal consistency of this measure are particularly favorable. For the MCMI-II, the alpha coefficients obtained were greater than .80 for 20 of the 26 scales ranging from .90 to .66 (Gonclaves et al., 1994). Studies of the test-retest reliability of this measure have only been performed for shorter intervals (two weeks or less). The test-retest reliability ratings ranged between .96 and .82 (Gonclaves et al., 1994). Validity studies using factor analysis on previous versions of the MCMI support the organization of the scales (Millon, 1987). Lastly, studies of the predictive power of the MCMI-II evidenced good predictive power ranging between .30 and .80 (Millon, 1987). Few studies have examined the predictive power of

the MCMI-III however and those that have indicated lower predictive power are likely due to clinicians' unfamiliarity with DSM-IV criteria when the studies were performed (Retzlaff, 2000).

Five-Factor Model measures. The FFM measures are the NEO-PI-R and the Goldberg "Big Five" lexical markers.

The NEO-PI-R (Costa and McCrae, 1985; Costa, McCrae, & Dye, 1991) is the most comprehensive measure of the five factors of personality that have been identified as inclusive of the major personality traits. Individuals rate themselves on 240 items using a five-point scale. In addition, six facet scales may be scored for a more fine-grained analysis of each of the domains. While this test was developed as a measure of normal personality (Costa & McCrae, 1992b), it has also been shown to have clinical applications (Costa & Widiger, 1994; McCrae, 1991). This instrument has been demonstrated to have impressive factorial structure, internal consistency, validity, and longitudinal stability (e.g., Costa & McCrae, 1988). In term of its internal consistency, correlations for the main factors range from .86 to .95 while for the facet scales, correlations range from .56 to .90 (Costa & McCrae, 1992a). Reynolds and Clark (2001) also reported internal consistency reliability scores for the NEO-PI-R. The reliability scores for the domain scales were .93 (N), .90 (E), .91 (O), .83 (A) and .92 (C). The internal consistency reliability scores for the facet scales were also reported, these ranged from .58 to .87 with a median coefficient alpha of .77. Using different samples, test-retest studies ranging from 3 months to 7 years have averaged around correlations in the high .70s for the factors scales, and somewhat lower for the facet scales (Costa & McCrae, 1992a). There have also been many studies examining the convergent validity of this model with other personality inventories, showing very good convergence with most other personality tests (e.g., McCrae & Costa,

1982; Costa & McCrae, 1988; Costa & McCrae, 1989). For this study, only the five factor scores will be used.

The 100 Goldberg "Big Five" lexical markers (Goldberg, 1992) are presented in a unipolar format on an eight-point scale. Goldberg labeled his five factors Extraversion, Agreeableness or Pleasantness, Conscientiousness or Dependability, Emotional Stability, and Intellect or Sophistication. Goldberg (1992) provided evidence for the convergent and discriminant validity of this measure. He reported coefficient alpha reliability estimates for the five factors as .88, .88, .85, .88 and .84 and correlations with the corresponding scales from the more established NEO-PI R as .68, .54, .51, -.65 and .48.

Interpersonal Style and problems measures. These are the Interpersonal Adjectives Scales, Revised (IAS-R) and the Inventory of Interpersonal Problems (IIP).

The Interpersonal Adjectives Scales, Revised (IAS-R; Wiggins, Trapnell, & Phillips, 1988) is a self-report adjective checklist for the description of interpersonal style as arrayed on the circumplex. Two orthogonal dimensions, dominance and nurturance together form a circumplex of eight interpersonal octants. The eight octants are labeled as follows: assured-dominant (PA), arrogant-calculating (BC), cold-hearted (DE), aloof-introverted (FG), unassured-submissive (HI), unassuming-ingenuous (JK), warm-agreeable (LM) and gregarious-extraverted (NO). Participants rate themselves on 64 adjectives on a 1 to 8-point scale. The IAS is reported to have good internal consistency with Cronbach's Alphas ranging from .73 to .87 (Wiggins et al., 1988; Wiggins, 1995). It has been demonstrated that when the IAS-R scales are subjected to principal components analysis and the scales are plotted on the two extracted components, a clear circumplex structure emerges (Wiggins et al., 1988). In this study, only the scores on the two orthogonal dimensions, the dominance and nurturance factors, will be used.

The Inventory of Interpersonal Problems (IIP; Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1988) is a 127-item inventory devised to assess the extent to which individuals have problems in a broad cross-section of interpersonal domains. Unlike measures that assess interpersonal traits as an aspect of interpersonal functioning, the IIP was designed to assess the types of problems that individuals present in psychotherapy from an interpersonal perspective. Participants are asked to describe the amount of distress that they have experienced pertaining to various interpersonal problems on a five-point scale ranging from *Not at All* to *Extremely*. The IIP has demonstrated validity, a full-scale correlation of .58 when compared to the SCL-90R, a symptom checklist (Derogatis, 1983). Horowitz and colleagues (1988) reported a high test-retest correlation of .98. It has been demonstrated that when the IIP scales are subjected to principal components analysis a clear, two-factor structure emerges, accounting for 64.8% of the variance and a clear circumplex structure emerges (Alden, Wiggins, & Pincus, 1990). Convergent validity for this measure has been reported in comparison to the more established IAS-R. Pearson correlation coefficients ranged from .36 to .58 for the eight octants. In the present study, a summary score of all of the 128 items will be used for this measure.

Attachment Style Measures. These are the Relationship Questionnaire (RQ) and the Relationship Scales Questionnaire (RSQ).

The Relationship Questionnaire (Bartholomew & Horowitz, 1991) is a five-item measure. This measure consists of four paragraphs describing the four attachment styles. Each participant is asked to make ratings on a seven-point bipolar scale of the degree to which they resemble each style depicted. Participants then rate themselves categorically as to which of four attachment styles best describe them. The four attachment styles are

Fear, Dismissing, Secure and Preoccupied. In this study, the continuous scores for each style will be included in the analysis.

The Relationship Scales Questionnaire (RSQ; Griffin & Bartholomew, 1994) is another measure of the same four attachment styles using a true/false type format. Both the Relationship Questionnaire and the Relationship Scales Questionnaire are considered to have good reliability and internal consistency. Coefficient alphas range from .72 to .85 (Griffin & Bartholomew, 1994).

The Sociotropy vs. Autonomy Measures. These are the Depressive Experience Questionnaire and the Personal Style Inventory, version two.

The Depressive Experience Questionnaire (DEQ; Blatt, D'Afflitti, & Quinlan, 1976) is a dimensional measure of three personality traits, Dependency, Self-Criticism and Efficacy, which are believed to be related to the experience of different kinds of depression. The DEQ has been shown to have high internal consistency (Mongraine & Zuroff, 1994) and convergent and discriminant validity (Blaney & Kutcher, 1991). In this study (as in most other studies using this measure), only the dimensions of Self-Criticism and Dependency will be included in the analysis.

The Personal Style Inventory II (Robins, Ladd, Welkowitz, Blaney, Diaz, & Kutcher, 1994) is a 48-item inventory in which individuals assess themselves regarding two major personal orientations that have often been described as agency or autonomy and relatedness or sociotropy. Unlike other scales of this sort (such as the DEQ), the PSI is not related to depression or other forms of psychopathology, but measures these styles merely as aspects of personality. Respondents reply on a 1 to 6 scale. The two scales are considered independent of one another and are calculated separately. The constructs are Sociotropy and Autonomy are closely related to Dependency and Self-Criticism, but

extreme scores are not as indicative of psychopathology. Theses scales were constructed and validated using clinical (depressed) and undergraduate university student samples (Robins et al., 1994). Both measures are considered to have good reliability and internal consistency. Coefficient alphas range from .87 to .88 for Sociotropy and .82 to .86 for Autonomy (Robins et al, 1994; Sato & McCann, 1997, 1998, 1999). Using samples of undergraduate students, five to thirteen week test-retest reliability for these measures ranged between .80 and .85 for Sociotropy and .70 and .74 for Autonomy (Ouimette & Klein, 1993; Robins et al., 1994). Both Sociotropy and Autonomy measures have also demonstrated good convergent validity with the DEQ scales of Dependency and Self-Criticism (Blatt & Zuroff, 1992).

Lastly, the demographics questionnaire includes questions pertaining to age, gender, race/ethnicity, marital status and level of education.

Procedure

All questionnaires were re-created in a password-protected website as part of a larger personality study. The website contains 14 questionnaires. Data from 11 of the questionnaires were used for this study. The website was developed to provide a convenient way for students to complete the lengthy questionnaires and is accessible only with a username and password. The data was collected from January 2002 to August 2002, during the winter and summer semesters. Participants provided informed consent by submitting a form on the website and were asked to complete all of the questionnaires within a one-week period, before their username and password expire. Participants responded to each item on the 11 different questionnaires by clicking on "Radio Buttons" resembling "bubbles" on a scantron sheet. There are 981 items in total, including the demographics section. Multiple measures of each proposed construct were included in the

website in order to increase the validity of the findings. Each participant was also randomly assigned to one of three orderings of the questionnaires in order to counterbalance for fatigue effects and order effects when completing the questions. There were no significant differences between the different orders of administration and the scored scales for any of the measures.

Results

An examination of the assumptions of normality revealed that none of the scored scales were significantly skewed. A visual inspection of the histograms indicated that all scales were relatively normally distributed and statistically, the skewness for all scales fell between −1.5 and 1.6, adequate considering the sample size (Tabachnick & Fidell, 2001).

Data Reduction of Dependent Variables

In order to determine if any of the described constructs capture any personality disorder variance above and beyond the FFM, a data reduction technique was first utilized to create a smaller number of continuous variables (5 as opposed to 20) using the personality disorder scores. This technique provided the added bonus of attempting to move away from having to perform this analysis for 10 separate personality disorders as measured by two separate inventories and allows for multiple personality disorder diagnoses. Thus, it was preferable to aggregate the personality disorder data so that they better represent the participants' overall personality disorder profile as opposed to merely representing each participant's standing on individual disorders. Perhaps more importantly, it cannot be expected that the FFM, as a data-reduction model, explain all of the common and specific variance contained within the personality disorder measures (O'Connor, 2002). Therefore, by also using this data reduction technique on the personality disorder measures and thereby creating component scores containing only the common variance among the Personality Disorder scales, the FFM was allowed to capture the maximum amount of variance before the other personality measures were added to the equation.

To create a date reduction model of the personality disorder measures, the ten personality disorder scores from the two inventories were reduced into a smaller number

of component factors using Principal Components Analysis (PCA). PCA is often used as a data reduction technique to identify a small number of factors that explain as much of the variance as possible observed in a much larger number of manifest variables. PCA has been described as the solution of choice for researchers primarily interested in reducing a large number of variables down to a smaller number of components (Tabachnick & Fidell, 2001). Thus, this technique was used to create continuous component scores using the 10 personality disorder scale scores.

Scores on the 10 personality disorder scales for each participant were subjected to PCA with varimax rotation for both the MCM-III and the PDQ-4 measures combined (see Table 1). Varimax was selected in order to identify uncorrelated variables, each accounted for independent and unique personality disorder variance. The component loadings were evaluated to determine whether similar personality disorder scales from these two tests loaded onto the same components and if the loadings made theoretical sense.

The number of components to be utilized as the predicted variables were selected using standard criteria. Namely, using principle components analysis with varimax rotation (in order to maximize the variance of component loadings within components), the selection criteria were components with eigenvalues approximately greater than one and an examination of the scree plot (Tabachnick & Fidell, 2001). Inspection of the scree plot suggested the retention of five components (see Figure 1). While only four components had actual eigenvalues over one, the fifth value had an eigenvalue of .98. The four-component solution explained 68.25% of the variance while the five-component solution explained 72.98% of the variance. A five-component solution was selected as the dependent variable. This resulted in extracting some small factors but a liberal extraction strategy was favoured. This would allow for the broadest test of the hypotheses.

Internal consistency coefficients were obtained for the five components. All components showed good internal consistency with alpha coefficients of .86, .90, .77, .80, and .80.

All of the PDQ-4 scales had moderate to high loadings on the first principal component except for Schizoid (see Table 1). Dependent, Borderline and Paranoid were the only MCMI-III scales which loaded onto the first component, which accounted for 41.12% of the total variance.

The second component accounted for 10.48% of the variance. All of the MCMI-III scales excluding Compulsive and Narcissistic loaded above .3. The Paranoid and Schizotypal scales from the PDQ-4 also loaded onto the second component.

The third component accounted for 8.79% of the variance. Antisocial and Borderline personality scales from the MCMI-III and the PDQ-4 loaded above .3, and the MCMI-III Compulsive scale had a negative loading.

Loadings above .3 on the fourth factor include Dependent for both measures, Avoidant for both measures and negative loadings for both the MCMI Histrionic and Narcissistic scales. The fourth component accounted for 7.30% of the variance. The MCMI-III and PDQ-4 Dependent and Avoidant personality scales loaded above .3. The MCMI-III Histrionic and Narcissistic scales also loaded on this component, in the opposite (negative) direction.

The fifth component accounted for 4.92% of the variance. The MCMI-III and PDQ-4 Schizoid, the PDQ-4 Schizotypal, and the MCMI-III Avoidant scales all loaded onto this component above .3. The MCMI-III histrionic scale also loaded on this component in the negative direction.

While further analyses are not contingent upon an accurate identification and description of the components, they were examined to determine if the components could be identified and labeled and if they made "sense." To do this, the loadings on the components were scrutinized to see if there were any trends. Speculatively, this solution suggests that the first two components reflect a difference in the response metric (as the MCMI-III scales are all weighted but the PDQ-4 scales are not) or perhaps a difference in the underlying conceptual differences in the defining of the Personality Disorders. The PDQ-4 uses DSM-IV criteria while the MCMI-III is based on Millon's theory of personality psychopathology, which differs somewhat from the DSM-IV conceptualization of these disorders (Millon & Davis, 1995). Based on the scale loadings, the third component seems to be related to antisocial behaviours. The Personality Disorders that load onto the fourth component seems related to low self-esteem or anxiety, two of the common aspects relating Avoidant and Dependent Personality Disorder. Lastly, as indicated by the scale loadings, the fifth component seems related to lack of sociability or introversion, common elements related to Schizoid and Schizotypal Personality Disorder (see Table 1 for loadings).

Regression Analyses

The hypothesis stating that personality measures based on interpersonal theory, the theory of sociotropy vs. autonomy, and attachment theory, will capture significant amounts of Personality Disorder variance above and beyond that which the FFM will explain was tested using multiple regression analysis. The five dimensions from the Five-Factor Model for both measures were entered as the initial block of variables into the regression equation. In a second step, all other variables were entered. It was hypothesized that a significant R^2 change at this second step would provide evidence to reject the null

hypothesis that the FFM explains all significant variance in the personality disorder variables. Furthermore, it was also hypothesized that the other measures, when combined would account for more variance then the FFM scales alone.

Five hierarchical regressions were performed (one for each of the Personality Disorder component scores obtained from the PCA – the dependent variables) and for each analysis, the predicted values of the dependent variables were plotted against the residuals in order to confirm the assumptions of normality, linearity, and homoscedasticity. Fortunately the component scores are all standardized scores and all assumptions were met.

For the first component, the first step consisting of the FFM alone returned an R^2 of .32 ($F_{(10, 277)} = 13.27, p < .001$), while the second step returned a significant R^2 change of .14 ($Fchg_{(15,262)} = 4.52\ p < .001$). Thus, the other measures accounted for 14% of the variance above and beyond the FFM (see Table 2). In the second step of the hierarchical regression, when all of the measures were included, the Big Five factors Surgency ($\beta =$ .23, $t = 2.60, p = .010$) and Emotional Stability ($\beta = -.22, t = -3.09, p = .002$), the PSI scale of Sociotropy ($\beta = .17, t = 2.20, p = .029$), the DEQ scale of Self-Criticism ($\beta = .19$, $t = 2.91, p = .004$), and the RQ scales of Secure ($\beta = .22, t = 2.72, p < .001$) and Fearful ($\beta = .16, t = 2.36, p = .019$) all significantly contributed to the model. Table 3 displays the unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β) for the individual scales, R, R^2 and adjusted R^2 for both steps.

Using the second set of component scores in the next regression, the first step consisting of the FFM alone returned an R^2 of .16 ($F_{(10, 277)} = 5.27, p < .001$) while the second step returned a significant R^2 change of .13 ($Fchg_{(15, 262)} = 3.14, p < .001$). Thus,

the other measures accounted for 13% of the variance above and beyond the FFM (see Table 4). In the second step of the hierarchical regression, when all of the measures were included, the NEO factor Agreeableness (β = -.19, t = -1.99, p = .048), and the RSQ scale of Preoccupied (β = .30, t = 2.41, p = .017) all significantly contributed to the model. Table 5 displays the unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β) for the individual scales, R, R^2 and adjusted R^2 for both steps.

Using the third set of component scores in the next regression, the first step consisting of the FFM alone returned an R^2 of .44 ($F_{(10, 277)} = 21.80, p < .001$) while the second step returned a significant R^2 change of .06 ($Fchg_{(15, 262)} = 1.98, p = .017$). Thus, the other measures accounted for 6% of the variance above and beyond the FFM (see Table 6). In the second step of the hierarchical regression, when all of the measures were included, the NEO factors Extraversion (β = .18, t = 2.38, p = .018), Agreeableness (β = -.22, t = -2.83, p = .005) and Conscientiousness (β = -.53, t = -7.40, $p < .001$), the PSI scale of Sociotropy (β = -.19 t = -2.57, p = .011), and the RSQ and RQ Preoccupied scales (β = -.27, t = -2.55, p = .011) and (β = .12, t = 2.23, p = .027) respectively all significantly contributed to the model. Table 7 displays the unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β) for the individual scales, R, R^2 and adjusted R^2 for both steps.

Using the fourth set of component scores in the next regression, the first step consisting of the FFM alone returned an R^2 of .53 ($F_{(10, 277)} = 31.62, p < .001$) while the second step returned a significant R^2 change of .08 ($Fchg_{(15, 262)} = 3.44, p < .001$). Thus, the other measures accounted for 8% of the variance above and beyond the FFM (see

Table 8). In the second step of the hierarchical regression, when all of the measures were included, the Big Five factors of Conscientiousness ($\beta = .17$, $t = 2.43$, $p = .016$) and Emotional Stability ($\beta = -.19$, $t = -3.09$, $p = .002$), the NEO factors of Neuroticism ($\beta = .18$, $t = 2.48$, $p = .014$), Extraversion ($\beta = .18$, $t = 3.40$, $p = .001$), and Agreeableness ($\beta = -.39$, $t = 5.70$, $p < .001$), the total IIP score ($\beta = .18$, $t = 3.40$, $p < .001$), the PSI scale of Autonomy ($\beta = -.13$, $t = -2.22$, $p = .027$), the DEQ scale of self-criticism ($\beta = .11$ $t = 2.02$, $p = .045$), the RSQ Fearful scale ($\beta = -.17$, $t = 2.02$, $p = .030$) and the RQ Dismissing scale ($\beta = -.17$, $t = -2.64$, $p = .030$) all significantly contributed to the model. Table 9 displays the unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β) for the individual scales, R, R^2 and adjusted R^2 for both steps.

Using the fifth set of component scores in the next regression, the first step consisting of the FFM alone returned an R^2 of .34 ($F_{(10, 277)} = 14.27$, $p < .001$) while the second step returned a significant R^2 change of .16 ($Fchg_{(15, 262)} = 5.45$, $p < .001$). Thus, the other measures accounted for 16% of the variance above and beyond the FFM (see Table 10). In the second step of the hierarchical regression, when all of the measures were included, the Big Five factors of Surgency ($\beta = -.28$, $t = -3.27$, $p = .001$) and Emotional Stability ($\beta = .16$, $t = 2.28$, $p = .023$), the NEO factors of Extraversion ($\beta = -.36$, $t = -4.912$, $p < .001$), and Conscientiousness ($\beta = .19$, $t = 2.69$, $p = .008$), the PSI scales of Sociotropy ($\beta = -.31$, $t = -4.31$, $p < .001$) and Autonomy ($\beta = .33$, $t = 5.07$, $p < .001$), the DEQ scale of Dependency ($\beta = -.115$, $t = -2.05$, $p = .041$), and the RSQ Fearful scale ($\beta = .24$, $t = 2.74$, $p = .007$) all significantly contributed to the model. Table 11 displays the

unstandardized regression coefficients (*B*) and intercept, the standardized regression coefficients (β) for the individual scales, *R*, R^2 and adjusted R^2 for both steps.

Since the R^2 change was found to be significant for each regression analysis, the next step taken was to verify the amount of unique variance accounted for by the other measures compared to the FFM by reversing the order of entry into the steps of the regression equation. Thus, each regression analysis was re-run but the order of entry was reversed. The other personality measures were entered into the first block and the FFM factors were entered into the second block. This was repeated for all five component variables. The purpose of this was to compare the R^2 change for the second model of the initial set of regressions for each component with the R^2 change obtained when first inserting the other measures into the first step of the regression, then the FFM scales into the second step of the equation. The R^2 change was greater for the step including the IAS, IIP, DEQ, PSI, RSQ and RQ for the first component (.14 vs. .08), the second component (.13 vs. .03), and the fifth component (.16 vs. .15), while for the third and fourth component the R^2 change was greater in favour of the FFM (.06 vs. .33 for the former and .08 vs. .14 for the latter), all R^2 changes were significant at $p < .001$ (see Table 12).

Discussion

Testing the primary hypotheses

To properly test the hypotheses posited in this study, dependent variables needed to be created that would both aggregate the Personality Disorder data but also "even out the playing field" so that the FFM could be properly tested. Using Principal Components Analysis, 73% of the Personality Disorder variance was accounted for by five component variables, the dependent variables in this study. The five components derived by this data-reduction technique allowed the FFM, also a data-reduction model, to capture as much of the common variance as possible before other measures were entered into the equation. As O'Connor (2002) stressed, completely accounting for and differentiating between specific personality variables is not attainable by a data-reduction model such as the FFM. Thus, one of the main reasons the Personality Disorder principal components were derived was to allow the FFM the opportunity to capture as much of the common variance within the personality disorders before the other measures were given their opportunity. By combining two Personality Disorder inventories together, it was expected that not only would the results of the PCA pull out components comprised of the common variance between the scales within each measure, but also the common variance between the two batteries. By eliminating the specific and error variance from both within and between the two Personality Disorder measures, it was expected that the FFM would be given a more "equal footing" with the other measures.

While critics are constantly suggesting that the FFM cannot account for many aspects of personality found in other inventories, particularly in personality disorder inventories, O'Connor (2002) suggested that these unaccounted aspects should, when

factor analysed, form dimensions that differ from the five factors. This study has attempted isolate any such personality disorder factors to test against the FFM.

The main purpose of this study was to test the null hypothesis that the FFM explains all significant variance in personality disorder scales and determine whether additional measures, based on different personality theories, could account for additional variance above and beyond that accounted for by the FFM. The findings of this study supported the alternative hypothesis; that other measures can account for additional variance above and beyond the FFM. It was also hypothesized that the other personality measures, when combined, would account for more of the common variance then the FFM scales alone.

The results of this study showed that although the overall amount of unique variance accounted for within the Personality Disorder scores was impressive (46% for the first component, 29% for the second component, 50% for the third component, 61% for the fourth component, and 50% for the final component), the Five-Factor model did successfully capture a portion of each Personality Disorder component (32% for the first component, 16% for the second component, 44% for the third component, 53% for the fourth component, and 34% for the fifth component). In the first step of the regression analyses performed for each of the component variables, all of the FFM scales were entered, returning a significant R^2 for the set in each regression. This showed that the FFM can account for a significant amount of variance for all of the components. The rest of the personality measures, however, were also able to account for significant amounts of variance above and beyond the FFM (14% for the first component, 13% for the second component, 6% for the third component, 8% for the fourth component, and 15% for the fifth component).

In order to determine which set of variables accounted for more unique variance (the FFM or the other personality measures), the regression analyses were repeated, but the order of entry was reversed such that the other personality measures were entered into the first model and the FFM factors were entered into the second model. When the R^2 change statistics for the reverse entry regression analyses were compared with the R^2 change statistics from the original regression analyses it was determined that the R^2 change was greater for the other personality measures for the first, second, and fifth components, while the R^2 change for the third and fourth component was greater in favour of the FFM. This indicates that, while the FFM did account for a great deal of variance overall, the other personality measures, when combined, were able to account for more variance than the FFM alone. Since the first two components were composed of most of the Personality Disorder common variance (51.6%), the results of the analyses using the first two components are more relevant and noteworthy than the last three components.

Testing the secondary hypotheses

Secondary hypotheses were also posited attempting to predict how well the other personality measures would perform compared to the FFM. The three personality theories included in this study were sociotropy vs. autonomy, interpersonal theory and attachment theory. Measures associated with these theories were all included based on evidence that they would account for unique variance left unaccounted by the FFM. However, research has shown that the two constructs, Dominance and Affiliation as described by interpersonal theory, are very similar to two FFM factors, Extraversion (or Surgency) and Agreeableness (McCrae & Costa, 1989). Thus, it was hypothesized that these measures might better account for personality disorder variance in a manner more parsimonious and comprehensive than the FFM.

Since two measures for each theory were included in the study, hypotheses could also be put forward to predict which of the two would be more successful at capturing personality disorder variance. The domains of Sociotropy and Autonomy are personality styles that may include aspects of personality psychopathology lacking in the FFM, particularly when using the DEQ. It was thus postulated that, while the Robins and colleagues' (1994) conceptualization of these traits as operationalized by the PSI might provide a more parsimonious measure of personality psychopathology, the DEQ dimensions would account for even more variance in the Personality Disorders, above and beyond that accounted for by the FFM.

The first Personality Disorder component was used as the dependent variable in the first sequential regression equation to test this hypothesis. An initial exploration of the PCA components indicated that the first component was comprised mostly of variance from the PDQ-4, although some of the MCMI-III scales also loaded with moderately high loadings onto this component. For this first component, in the second block, six scales significantly contributed to the model as predictors. The scales were the Big Five factors of Surgency and Emotional Stability, the PSI scale of Sociotropy, the DEQ scale of Self-Criticism, and the RQ scales of Secure and Fearful. The fact that the DEQ accounted for a significant amount of variance after the PSI-II scale of Sociotropy was entered is an interesting finding and supports the secondary hypothesis that the DEQ may be a better predictor of Personality Disorders than the PSI-II due to the inclusion of psychopathological characteristics in the measure. There is also a considerable interpersonal aspect to the first component considering the inclusion of Surgency, Sociotropy, Self-Criticism and the attachment style scales of Secure and Fearful. The

inclusion of the Big Five Emotional Stability and the negative valence of its regression coefficient indicate that this component is comprised largely of interpersonal anxiety.

The second component was comprised of mostly MCMI-III Personality Disorder scales, although two PDQ-4 scales (Paranoid and Schizotypal) had moderately high loadings on this scale, suggesting that this component is related to distorted thinking. For this second component, in the second block, two scales significantly contributed to the model as predictors. The scales were the NEO factor Agreeableness, and the RSQ scale of Preoccupied. That the NEO factor of Agreeableness accounted for significant variance, while the Big Five Factor of Agreeableness did not indicates that the NEO factor includes different content than the Big Five version of this construct. The variance accounted for by the Preoccupied scale and the negative valence of the Agreeableness regression coefficient indicates that the component represents a negative self-image construct and is also related to disagreeableness. However, the personality scales explained only 29% of the variance within this component. While disagreeableness and an indicator of self-preoccupation explain a portion of this component, 70% of the variance is left unaccounted for. None of the personality measures included in this study include measures of disordered thinking except for the MCMI-III and the PDQ-4, which may be why an accurate description of the component was not obtained through this analysis.

The third component appears related to antisocial behaviours as indicated by the moderately high positive loadings of Borderline for both Personality Disorder measures and the very high positive loadings for Antisocial for both Personality Disorder measures as well as the very high negative loading of the MCMI-III Compulsive scale, For this third component, in the second block, six scales significantly contributed as predictors to the model. The scales were, the NEO factors Extraversion, Agreeableness and

Conscientiousness, the PSI scale of Sociotropy, and the RSQ and RQ Preoccupied scales. Agreeableness, Conscientiousness, Sociotropy and RSQ Preoccupied, all had negative regression coefficients indicating that this component is related to decreased Agreeableness, decreased Conscientiousness and little need to relate to others.

The speculative interpretations of the first three components based on the factor loadings and significant regression coefficients are supported by previous research using the MCMI-III. Craig and Bivens (1998) found that, when factor analyzed, the MCMI-III scales loaded onto three factors. They described the first as general maladjustment, the second as paranoid thinking with detached emotionality, and the third as antisocial acting out.

The fourth component is likely related to low self-esteem as indicated by the moderately high loadings of Avoidant and Dependent and negative loadings of Narcissistic and Histrionic Personality Disorders. For this fourth component, in the second block, ten scales significantly contributed to the model as predictors. The scales were the Big Five factors of Conscientiousness and Emotional Stability (negative coefficient), the NEO factors of Neuroticism, Extraversion (negative coefficient), and Agreeableness, the total IIP score, the PSI scale of Autonomy (negative coefficient), the DEQ scale of self-criticism, the RSQ Fearful scale (negative coefficient) and the RQ Dismissing scale (negative coefficient). The significant contribution of the Neuroticism scales for both FFM measures is notable (this construct is labeled Emotional Stability in the Big Five measure). For this component, 61% of the variance was accounted for by the personality measures. However, this component represents only 7.3% of the common variance within and between the personality Disorder measures. This component seems to

represent a great deal of interpersonal problems (as indicated by the significance of the Extraversion and Agreeableness factors), negative self-image and fear of failure.

The final component may be related to introversion or asocial tendencies as indicated by the moderately high loadings for PDQ-4 Schizotypal and MCMI Avoidant, as well as the high loadings for Schizoid for both measures and high negative loading for MCMI Histrionic. For this fifth component, in the second block, ten scales significantly contributed to the model as predictors. The scales were the Big Five factors of Surgency (negative coefficient) and Emotional Stability, the NEO factors of Extraversion (negative coefficient), and Conscientiousness, the PSI scales of Sociotropy (negative coefficient) and Autonomy, the DEQ scale of Dependency (negative coefficient) and the RSQ Fearful scale all significantly contributed to the model. Again, the DEQ scale of Dependency accounted for variance along with the PSI scale of Sociotropy, indicating that the DEQ scale of Dependency contains information that can describe aspects of this component lacking in the PSI scale of Sociotropy. However, both of the PSI-II scales accounted for significant variance in this component while only one of the DEQ scales contributed. This model captures 50% of the total variance within the component, while the component itself only represents about 5% of the common Personality Disorder variance. However, this model does seem to support the initial speculation that this component is comprised of introversion and asocial tendencies, postulated at first inspection of the PCA loadings.

Interpretations of the results suggest that all of the measures of sociotropy, autonomy and attachment style capture unique variance above and beyond that accounted for by the FFM. In the case of sociotropy vs. autonomy, both the DEQ and the PSI-II accounted for significant variance in most of the regression models. It is unclear however which inventory is a better contributor to an overall Personality Disorder model since both

of the measures accounted for significant amounts of unique variance in most of the regression analyses.

Scales from the attachment measures accounted for significant variance on each of the five Personality Disorder variables after all variance accounted for by the FFM was removed. Although hypotheses were not made regarding which attachment measures would capture more Personality Disorder variance, the results of this study suggest that both measures made independent contributions to the models. Recently, attachment theory has started reappearing in Personality Disorder research, although most studies attempt to define discrete personality disorders in relation to attachment style as opposed to explaining Personality Disorders in general (Bender et al., 2001; Feeney & Noller, 1990; Trull, Widiger & Frances, 1987). As Andreasen and Carpenter (1993) stated, classification based on etiological mechanisms may help to better define Personality Disorders. Clarifying the relations between attachment styles and Personality Disorder features may point to potential mediators of treatment response (Meyer, Pilkonis, Proietti, Heape, & Egan, 2001).

It was also hypothesized that interpersonal measures would account for Personality Disorder variance in a manner more parsimonious and comprehensive than the FFM. This hypothesis was not fully supported by the results of this study. While the total IIP score did account for significant variance in the fourth component, indicating that a measure of interpersonal problem severity may aid in the description of Personality Disorders, neither of the IAS-R scales (Dominance and Loving) captured any significant amount of variance left over after the FFM was entered into the model. Previous research has indicated that Dominance and Loving are highly related to the FFM factors of Agreeableness and Extraversion (McCrae & Costa, 1989). While the IAS-R failed to

contribute, the theory underlying the development of the interpersonal measures can still be related to the results achieved by the Extraversion (or Surgency) and Agreeableness factors and increase our understanding of the etiology and treatment implications of Personality Disorders.

Furthermore, the NEO factor Openness to Experience and the corresponding Big Five factor Intellect did not significantly account for any of the Personality Disorder variance in any of the regression analyses, even though extreme scores on this factor are related to unconventional thoughts and behaviours. This indicates that even extreme scores on these related factors are not indicative of any personality psychopathology or the interpersonal problems associated with the DSM-IV Personality Disorders. This result has been found in many other studies attempting to validate the NEO as a measure of Personality Disorders (i.e., Coolidge et al., 1994).

Conclusion

There is considerable evidence that the FFM is capable of capturing a portion of each component drawn from the two FFM inventories in this study, the fact that there was variance left to be explained indicated that measures of the FFM could be improved to better account for the overall construct(s) of personality psychopathology. However, most current discussions on this issue seem to focus on refinement at the facet level (Costa & McCrae, 1995; Widiger & Trull, 1992). The success of the other measures derived from other personality theories suggests that there may be a fundamental gap in the content used to derive the FFM. Refinement of the FFM facets may not be sufficient to improve the model as a measure of Personality Disorders. The content lacking in the FFM may not necessarily be traditionally personality research related but may need to be sought out in other theories, perhaps those related to intrinsic needs, morals, values or goals.

For example, the PSI scale Sociotropy seemed to account for a significant amount of variance above and beyond that accounted for by the FFM. Sociotropy can be defined as a need for affiliation, a fundamental drive that differs considerably between individuals (Beck, 1993; Blatt, 1991). There is also considerable research indicating that much maladaptive behaviour associated with Personality Disorders has a large cognitive component, particularly related to bizarre or disordered thinking. Items within Personality Disorder measures such as the PDQ-4 and the MCMI-III address this component. Results of this study indicate that this content is not properly addressed by the FFM. Block (1995) stated that in order to best describe and predict the personality structure of an individual it is necessary to understand the dynamic link between the motivations, perceptions and cognitions of the individual as they act as a psychological system. Block (1995) stressed that the FFM does not offer a sense of what may transpire within this personality structure. While Block's criticism is aimed particularly at the FFM, it may also apply, in part, to other personality theories, which do not fully account for the dynamic integration of the different systems within a psychological structure.

Limitations of the Study

The use of a student population should be sufficient to collect a large enough and varied enough sample of personality disordered participants, since approximately 6-9% of the population will have one or more personality disorder (APA, 1994). Previous researchers have found that about 25% of college students meet criteria for at least one personality disorder diagnosis using self-report questionnaires (PDQ-R; Dolan, Evans & Norton, 1995; Xiufen, Yueqin, & Liming, 2000). However, the randomized sample collected through the participant pool was not sufficiently diverse enough in terms of age,

gender and ethnicity, limiting its generalizability to the general public. While Personality Disorders are characterized as long-standing psychopathology, the lack of variability in the ages of the participants in the sample may not affect its generalizability. However, the large discrepancy between the number of males and females in the sample (49 males and 239 females) is problematic. There are gender differences between the prevalence and severity of most of the Personality Disorders. According to Marshall and Serin (1997), Schizotypal and Antisocial Personality Disorder tend to occur more frequently in men, while Histrionic and Borderline Personality Disorder and the cluster C disorders of Avoidant, Dependent and Obsessive-Compulsive Personality Disorder tend to occur more frequently in women. Furthermore, since a student population was used, the results cannot be automatically applied to a clinical population.

Since the personality data was collected via self-report, it could considered biased. Individuals with personality psychopathology may be particularly inept at describing themselves accurately (Costa & McCrae, 1992). Hopefully the web-based procedures allowed for a greater degree of anonymity unlike situations when the experimenter remains in the room with the participants during testing. The web-based procedures may also be considered a limitation in that testing does not occur in a controlled environment. Participants were allowed to complete the questionnaires from home or any environment with Internet access. Confounds such as noise levels and other distractions cannot be controlled via this method of data collection.

Implication of the Findings and Future Directions

There continues to be much debate about the current classification system of personality disorders (Clark, Watson, & Reynolds, 1995). The present system lacks an

empirical basis and leads to heterogeneous categorizations and multiple diagnoses. In fact, the most common diagnosis is Personality Disorder Not Otherwise Specified (Gunderson, 1998; Klein, 1993; Livesley et al., 1994). Many personality researchers are attempting to resolve the current classification problems by developing new models or personality psychopathology (i.e., Benjamin, 1996; Cloninger & Svrakic, 1994; Costa & McCrae, 1985).

The findings of this study indicate that the while the FFM is able to account for a great deal of Personality Disorder variance in dimensional terms, it is not sufficient to accurately describe personality psychopathology in a clinically useful manner. It is conceivable that a dimensional system is the best way to describe personality psychopathology and the results of this study provide support for the combination of numerous dimensional measures based on several different theories that, when combined, provide a better description of personality psychopathology then the FFM alone. Not only would the inclusion of other personality measures provide a better description of personality disorders, but would also include etiological information that would provide additional insight into treatment implications.

With a larger sample size, model-building analyses such as Statistical Regression (or Stepwise Regression) could be used to test individual measures along with the FFM and determine the best possible combination of measures that would explain Personality Disorder variance in an empirically sound and clinically relevant manner. With this technique, scales from various measures or even items from various measures could be combined to create a multiphasic Personality Disorder Inventory that could provide profile analysis and include etiological, prognostic and treatment implications.

Also, by extracting component scores from the Personality Disorder scales, the usual disadvantage faced by the five-factor model was hopefully reduced or eliminated. Using similar methods, many other personality inventories could be compared with the Five-Factor Model in terms of their ability to account for Personality Disorder variance.

This study focused mainly on alternative personality theories that captured some of the personality disorder variance that the FFM cannot. However, it may be necessary to go beyond personality theory in order to best compensate for the FFM's failings as a measure of personality psychopathology, particularly in terms of its ability to explain the thought disorder aspect of many of the Personality Disorders. While this study had many limitations, its exploratory nature was also its strength, broadening of our understanding of many new variables that may be capitalized in future Personality Disorder research.

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Table 1. Varimax Rotated Component Matrix

	Component				
	1	2	3	4	5
PDQ-4Obsessive-Compulsive	.705				
PDQ-4 Histrionic	.699				
PDQ-4 Paranoid	.637	.333			
PDQ-4 Narcissistic	.635				
PDQ-4 Borderline	.616		.424		
PDQ-4 Schizotypal	.587	.304			.380
PDQ-4 Dependent	.557			.504	
MCMI Schizotypal		.826			
MCMI Paranoid	.399	.784			
MCMI Avoidant		.693		.492	.304
MCMI Schizoid		.669			.579
MCMI Borderline	.338	.604	.487		
MCMI Dependent	.353	.602		.519	
MCMI Compulsive			-.841		
MCMI Antisocial		.434	.765		
PDQ-4 Antisocial	.389		.673		
MCMI Narcissistic				-.868	
PDQ-4 Avoidant	.511			.572	
PDQ-4 Schizoid					.786
MCMI Histrionic		-.410		-.468	-.640
Eigenvalue	8.22	2.10	1.76	1.46	.98
% Variance	41.12	10.48	8.79	7.30	4.92

Table 2. Regression of the first component entering FFM in first block and all other personality measures in the second block.

	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
Model					R Square Change	F Change	df1	df2	Sig. F Change
1	.57	.32	.30	.84	.324	13.27	10	277	.000
2	.68	.46	.41	.77	.139	4.51	15	262	.000

Table 3. Regression coefficients for the first component entering FFM in first block and all other personality measures in the second block.

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1(Constant)	-1.180	1.02		-1.16	.248
BIG FIVE Surgency	0.010	0.00	0.18	2.43	.016
BIG FIVE Agreeableness	-0.004	0.01	-0.06	-0.74	.462
BIG FIVE Conscientiousness	0.005	0.01	0.09	1.01	.312
BIG FIVE Emotional Stability	-0.018	0.00	-0.32	-4.30	.000
BIG FIVE Intellect	-0.003	0.01	-0.05	-0.61	.540
NEO Neuroticism	0.012	0.00	0.25	3.17	.002
NEO Extraversion	0.009	0.00	0.17	2.27	.024
NEO Agreeableness	-0.004	0.00	-0.08	-1.00	.317
NEO Openness to Experience	0.000	0.00	-0.01	-0.09	.930
NEO Conscientiousness	0.003	0.00	0.07	0.83	.405
2(Constant)	-3.080	1.30		-2.36	.019
BIG FIVE Surgency	0.012	0.01	0.23	2.60	.010
BIG FIVE Agreeableness	-0.005	0.01	-0.08	-0.80	.425
BIG FIVE Conscientiousness	0.005	0.01	0.08	0.96	.341
BIG FIVE Emotional Stability	-0.013	0.00	-0.22	-3.09	.002
BIG FIVE Intellect	0.000	0.01	0.00	-0.01	.996
NEO Neuroticism	0.001	0.00	0.03	0.37	.713
NEO Extraversion	0.007	0.00	0.14	1.87	.063
NEO Agreeableness	-0.006	0.00	-0.13	-1.58	.115
NEO Openness to Experience	0.000	0.00	0.00	-0.03	.979
NEO Conscientiousness	0.001	0.00	0.02	0.21	.831
IAS Dominance	-0.053	0.09	-0.05	-0.62	.533
IAS Loving	0.068	0.08	0.07	0.86	.390
IIP Sum	0.000	0.00	0.00	-0.05	.958
PSI Sociotropy	0.009	0.00	0.17	2.20	.029
PSI Autonomy	0.005	0.00	0.08	1.17	.244
DEQ Dependency	-0.001	0.00	-0.05	-0.81	.417
DEQ Self-Criticism	0.013	0.00	0.19	2.91	.004
RSQ Fearful	0.025	0.02	0.12	1.33	.190
RSQ Dismissing	-0.011	0.02	-0.07	-0.63	.530
RSQ Secure	0.003	0.01	0.02	0.19	.850
RSQ Preoccupied	-0.046	0.03	-0.20	-1.86	.060
RQ Secure	0.155	0.04	0.22	3.72	.000
RQ Fearful	0.088	0.04	0.16	2.36	.020
RQ Preoccupied	0.064	0.03	0.10	1.94	.050
RQ Dismissing	-0.006	0.03	-0.01	-0.19	.850

Table 4. Regression of the second component entering FFM in first block and all other personality measures in the second block.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.40	.16	.13	.93	.16	5.27	10	277	.000
2	.54	.29	.22	.88	.13	3.14	15	262	.000

Table 5. Regression coefficients for the second component entering FFM in first block and all other personality measures in the second block.

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1(Constant)	1.616	1.14		1.42	.156
BIG FIVE Surgency	-0.010	0.01	-0.19	-2.29	.023
BIG FIVE Agreeableness	-0.004	0.01	-0.07	-0.67	.503
BIG FIVE Conscientiousness	-0.002	0.01	-0.04	-0.37	.711
BIG FIVE Emotional Stability	0.000	0.01	0.00	-0.04	.965
BIG FIVE Intellect	0.006	0.01	0.09	1.11	.268
NEO Neuroticism	0.007	0.00	0.16	1.75	.082
NEO Extraversion	-0.001	0.00	-0.03	-0.32	.747
NEO Agreeableness	-0.010	0.00	-0.20	-2.27	.024
NEO Openness to Experience	0.000	0.00	0.01	0.10	.923
NEO Conscientiousness	0.001	0.00	0.03	0.30	.766
2(Constant)	-0.242	1.50		-0.16	.872
BIG FIVE Surgency	-0.008	0.01	-0.15	-1.50	.135
BIG FIVE Agreeableness	-0.001	0.01	-0.01	-0.09	.929
BIG FIVE Conscientiousness	-0.003	0.01	-0.05	-0.54	.587
BIG FIVE Emotional Stability	0.004	0.01	0.07	0.83	.409
BIG FIVE Intellect	0.006	0.01	0.09	1.10	.272
NEO Neuroticism	-0.004	0.01	-0.08	-0.82	.413
NEO Extraversion	-0.002	0.00	-0.05	-0.53	.599
NEO Agreeableness	-0.009	0.01	-0.19	-1.99	.048
NEO Openness to Experience	0.001	0.00	0.02	0.25	.801
NEO Conscientiousness	0.000	0.00	-0.01	-0.07	.948
IAS Dominance	0.033	0.10	0.03	0.33	.739
IAS Loving	-0.050	0.09	-0.05	-0.55	.582
IIP Sum	0.001	0.00	0.05	0.63	.527
PSI Sociotropy	0.008	0.01	0.15	1.78	.077
PSI Autonomy	0.006	0.01	0.10	1.29	.197
DEQ Dependency	0.001	0.00	0.08	1.13	.258
DEQ Self-Criticism	0.008	0.01	0.12	1.59	.113
RSQ Fearful	-0.002	0.02	-0.01	-0.09	.928
RSQ Dismissing	-0.020	0.02	-0.12	-1.01	.315
RSQ Secure	-0.024	0.02	-0.15	-1.46	.145
RSQ Preoccupied	0.069	0.03	0.30	2.41	.017
RQ Secure	-0.040	0.05	-0.06	-0.83	.410
RQ Fearful	0.002	0.04	0.00	0.05	.957
RQ Preoccupied	0.074	0.04	0.12	1.95	.052
RQ Dismissing	0.015	0.04	0.02	0.39	.700

Table 6. Regression of the third component entering FFM in first block and all other personality measures in the second block.

	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
Model					R Square Change	F Change	df1	df2	Sig. F Change
1	.66	.44	.42	.76	.44	21.81	10	277	.000
2	.71	.50	.45	.74	.06	1.98	15	262	.017

Table 7. Regression coefficients for the third component entering FFM in first block and all other personality measures in the second block.

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1(Constant)	4.211	0.93		4.54	.000
BIG FIVE Surgency	0.000	0.00	0.01	0.10	.921
BIG FIVE Agreeableness	-0.008	0.01	-0.12	-1.49	.138
BIG FIVE Conscientiousness	-0.003	0.01	-0.05	-0.67	.503
BIG FIVE Emotional Stability	0.001	0.00	0.01	0.16	.876
BIG FIVE Intellect	-0.001	0.01	-0.02	-0.32	.752
NEO Neuroticism	-0.001	0.00	-0.03	-0.34	.733
NEO Extraversion	0.005	0.00	0.11	1.50	.135
NEO Agreeableness	-0.012	0.00	-0.23	-3.25	.001
NEO Openness to Experience	0.009	0.00	0.16	2.50	.013
NEO Conscientiousness	-0.026	0.00	-0.53	-7.41	.000
2(Constant)	3.524	1.26		2.80	.006
BIG FIVE Surgency	0.001	0.01	0.02	0.21	.833
BIG FIVE Agreeableness	-0.002	0.01	-0.03	-0.35	.724
BIG FIVE Conscientiousness	-0.004	0.01	-0.06	-0.78	.436
BIG FIVE Emotional Stability	-0.001	0.00	-0.01	-0.18	.855
BIG FIVE Intellect	-0.001	0.01	-0.01	-0.14	.891
NEO Neuroticism	-0.001	0.00	-0.03	-0.33	.742
NEO Extraversion	0.009	0.00	0.18	2.38	.018
NEO Agreeableness	-0.011	0.00	-0.22	-2.83	.005
NEO Openness to Experience	0.005	0.00	0.10	1.50	.134
NEO Conscientiousness	-0.026	0.00	-0.53	-7.40	.000
IAS Dominance	-0.076	0.08	-0.08	-0.92	.359
IAS Loving	-0.060	0.08	-0.06	-0.78	.435
IIP Sum	0.000	0.00	0.00	0.02	.983
PSI Sociotropy	-0.010	0.00	-0.19	-2.57	.011
PSI Autonomy	-0.001	0.00	-0.01	-0.13	.900
DEQ Dependency	0.001	0.00	0.06	1.07	.286
DEQ Self-Criticism	0.007	0.00	0.11	1.68	.094
RSQ Fearful	0.028	0.02	0.13	1.52	.130
RSQ Dismissing	0.017	0.02	0.10	1.01	.313
RSQ Secure	0.015	0.01	0.09	1.06	.291
RSQ Preoccupied	-0.061	0.02	-0.27	-2.55	.011
RQ Secure	0.030	0.04	0.04	0.74	.463
RQ Fearful	-0.002	0.04	0.00	-0.06	.951
RQ Preoccupied	0.071	0.03	0.12	2.23	.027
RQ Dismissing	-0.015	0.03	-0.02	-0.44	.659

Table 8. Regression of the fourth component entering FFM in first block and all other personality measures in the second block.

	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
Model					R Square Change	F Change	Df1	df2	Sig. F Change
1	.73	.53	.52	.70	.53	31.62	10	277	.000
2	.78	.61	.57	.65	.08	3.44	15	262	.000

Table 9. Regression coefficients for the fourth component entering FFM in first block and all other personality measures in the second block.

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1(Constant)	-0.265	0.85		-0.31	.755
BIG FIVE Surgency	-0.012	0.00	-0.22	-3.58	.000
BIG FIVE Agreeableness	-0.001	0.01	-0.01	-0.19	.850
BIG FIVE Conscientiousness	0.006	0.00	0.10	1.44	.152
BIG FIVE Emotional Stability	-0.011	0.00	-0.19	-3.12	.002
BIG FIVE Intellect	-0.001	0.00	-0.02	-0.34	.732
NEO Neuroticism	0.016	0.00	0.36	5.34	.000
NEO Extraversion	-0.009	0.00	-0.19	-2.91	.004
NEO Agreeableness	0.022	0.00	0.44	6.72	.000
NEO Openness to Experience	-0.004	0.00	-0.08	-1.29	.197
NEO Conscientiousness	-0.005	0.00	-0.10	-1.45	.147
2(Constant)	-0.564	1.11		-0.51	.612
BIG FIVE Surgency	-0.007	0.00	-0.13	-1.72	.087
BIG FIVE Agreeableness	-0.002	0.01	-0.02	-0.29	.773
BIG FIVE Conscientiousness	0.011	0.00	0.17	2.43	.016
BIG FIVE Emotional Stability	-0.011	0.00	-0.19	-3.09	.002
BIG FIVE Intellect	-0.002	0.00	-0.03	-0.50	.617
NEO Neuroticism	0.008	0.00	0.18	2.48	.014
NEO Extraversion	-0.010	0.00	-0.20	-3.05	.003
NEO Agreeableness	0.020	0.00	0.39	5.70	.000
NEO Openness to Experience	-0.001	0.00	-0.01	-0.20	.840
NEO Conscientiousness	-0.006	0.00	-0.12	-1.96	.051
IAS Dominance	-0.078	0.07	-0.08	-1.07	.287
IAS Loving	-0.070	0.07	-0.08	-1.03	.303
IIP Sum	0.002	0.00	0.18	3.40	.001
PSI Sociotropy	0.007	0.00	0.12	1.93	.054
PSI Autonomy	-0.008	0.00	-0.13	-2.22	.027
DEQ Dependency	0.001	0.00	0.05	1.10	.275
DEQ Self-Criticism	0.008	0.00	0.11	2.02	.045
RSQ Fearful	-0.035	0.02	-0.17	-2.18	.030
RSQ Dismissing	-0.001	0.01	-0.01	-0.09	.933
RSQ Secure	-0.002	0.01	-0.01	-0.18	.856
RSQ Preoccupied	0.040	0.02	0.17	1.90	.059
RQ Secure	-0.065	0.04	-0.09	-1.84	.068
RQ Fearful	-0.024	0.03	-0.04	-0.76	.446
RQ Preoccupied	-0.032	0.03	-0.05	-1.15	.250
RQ Dismissing	-0.077	0.03	-0.12	-2.64	.009

Table 10. Regression of the fifth component entering FFM in first block and all other personality measures in the second block.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.58	.34	.32	.83	.34	14.27	10	277	.000
2	.71	.50	.45	.74	.16	5.45	15	262	.000

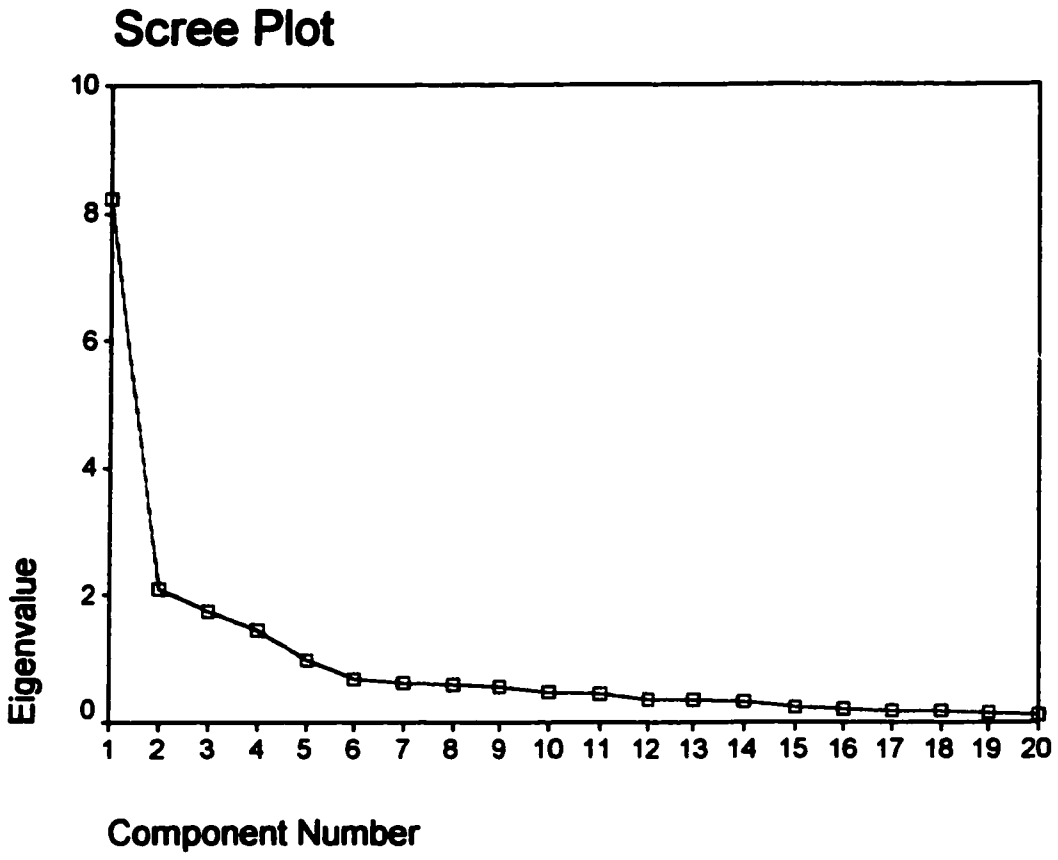
Table 11. Regression coefficients for the fifth component entering FFM in first block and all other personality measures in the second block.

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1(Constant)	3.126	1.01		3.10	.002
BIG FIVE Surgency	-0.010	0.00	-0.18	-2.40	.017
BIG FIVE Agreeableness	-0.011	0.01	-0.18	-2.03	.043
BIG FIVE Conscientiousness	0.004	0.01	0.07	0.79	.431
BIG FIVE Emotional Stability	0.009	0.00	0.16	2.18	.030
BIG FIVE Intellect	-0.002	0.01	-0.02	-0.32	.750
NEO Neuroticism	-0.004	0.00	-0.09	-1.08	.279
NEO Extraversion	-0.021	0.00	-0.42	-5.53	.000
NEO Agreeableness	-0.006	0.00	-0.11	-1.46	.147
NEO Openness to Experience	0.006	0.00	0.11	1.57	.117
NEO Conscientiousness	0.009	0.00	0.19	2.45	.015
2(Constant)	1.198	1.26		0.95	.343
BIG FIVE Surgency	-0.015	0.01	-0.28	-3.27	.001
BIG FIVE Agreeableness	-0.003	0.01	-0.05	-0.49	.628
BIG FIVE Conscientiousness	-0.001	0.01	-0.02	-0.30	.766
BIG FIVE Emotional Stability	0.009	0.00	0.16	2.28	.023
BIG FIVE Intellect	0.000	0.01	-0.01	-0.08	.941
NEO Neuroticism	-0.002	0.00	-0.04	-0.49	.628
NEO Extraversion	-0.018	0.00	-0.36	-4.91	.000
NEO Agreeableness	0.001	0.00	0.01	0.15	.881
NEO Openness to Experience	0.003	0.00	0.05	0.75	.452
NEO Conscientiousness	0.010	0.00	0.19	2.69	.008
IAS Dominance	0.118	0.08	0.12	1.43	.155
IAS Loving	0.056	0.08	0.06	0.73	.468
IIP Sum	0.000	0.00	-0.02	-0.31	.761
PSI Sociotropy	-0.017	0.00	-0.31	-4.31	.000
PSI Autonomy	0.021	0.00	0.33	5.07	.000
DEQ Dependency	-0.001	0.00	-0.12	-2.05	.041
DEQ Self-Criticism	0.005	0.00	0.07	1.16	.245
RSQ Fearful	0.050	0.02	0.24	2.74	.007
RSQ Dismissing	-0.002	0.02	-0.01	-0.11	.913
RSQ Secure	-0.005	0.01	-0.03	-0.36	.718
RSQ Preoccupied	-0.037	0.02	-0.16	-1.55	.122
RQ Secure	0.070	0.04	0.10	1.74	.083
RQ Fearful	0.024	0.04	0.04	0.65	.517
RQ Preoccupied	0.058	0.03	0.09	1.81	.072
RQ Dismissing	0.054	0.03	0.08	1.64	.103

Table 12. Regression findings by reversing the entry of the variables into the regression equation.

Initial Regression Block 1: NEO-PI-R, Big 5 Block 2: IAS, IIP, DEQ, PSI, RSQ, RQ					Reverse Order Regression Block 1: IAS, IIP, DEQ, PSI, RSQ, RQ Block 2: NEO-PI-R, Big 5				
	Adjusted R Square	Change Statistics				Adjusted R Square	Change Statistics		
Model		R Square Change	F Change	Sig. F Change	Model		R Square Change	F Change	Sig. F Change
First Component									
1	.299	.324	13.268	.000	1	.347	.381	11.166	.000
2	.411	.139	4.515	.000	2	.411	.082	3.981	.000
Second Component									
1	.129	.160	5.267	.000	1	.219	.260	6.356	.000
2	.220	.128	3.143	.000	2	.220	.028	1.043	.000
Third Component									
1	.420	.440	21.808	.000	1	.121	.167	3.627	.000
2	.449	.057	1.980	.000	2	.449	.331	17.246	.000
Fourth Component									
1	.516	.533	31.622	.000	1	.443	.473	16.245	.000
2	.573	.077	3.441	.000	2	.573	.137	9.226	.000
Fifth Component									
1	.316	.340	14.273	.000	1	.307	.344	9.490	.000
2	.449	.157	5.447	.000	2	.449	.153	7.988	.000

Figure 1. Following is the scree plot for the Varimax solution of the personality disorder scores Five factors were selected based on the scree plot even though the fifth factor offers only an eigenvalues of .95.



Appendix A: Web-based Consent Form

Participant:

Consent to Participate in Research

Project Title: Moderators of the relationship between Personality and Maladaptive Behaviour

Principle Investigator: Michelle-Renée Carroll
Faculty Sponsor: Stephen Hibbard, Ph.D.

After reading each point, indicate that you understand each point by clicking on the box.

At the end of the form, if you agree to participate, also click on the "I consent to Participate" button. If you have any questions contact the principle investigator via e-mail: mcarroll46@cogeco.ca

1. General purpose. For the past few years, studies have been conducted attempting to show how personality relates to maladaptive traits. In addition, other studies have been conducted to explore how people's styles of forming attachments to others also related to their interpersonal style. The purpose of the present study is to explore how these two might relate to one another.

☐ I understand

2. Procedures. For the purpose of this study I will be asked to complete a number of questionnaires pertaining to motivation, personality and other behaviours.

☐ I understand

3. Risks. I understand that there are no significant physical risks or likelihood of psychological injury as a result of reading these lists and giving my ratings. A few of the responses may cause temporary embarrassment or may remind me of acts or situations in my personal life I would rather not recall. However, the questionnaires have been filled out without any lasting effects by thousands of people. If, after responding to the items in these questionnaires , you experience any unpleasant emotions and feel the need to talk to someone about these emotions, help can be had through the Student Counselling Centre (2nd floor of the CAW centre 253-3000 x4616). If you prefer to seek help elsewhere, a list of resources is available to you through the Student Counselling Centre or through the Psychological Services Center.

☐ I understand

4. Confidentiality. I understand that my ratings will be completely confidential. There will be no recording of my name or any information that identifies me in any way with my responses. The results of the study showing group data may be later published.

 I understand

5. I understand that the results of the research will be available to me by request from Dr. Hibbard at 285 Chrysler Hall South (x2248). I also understand that Dr. Hibbard will be available to answer questions about this research during normal office hours Mondays, 10a.m. - 1p.m.

 I understand

6. I understand that my participation in the process is completely voluntary and that I will be able to withdraw at any time from the study without the loss of bonus points.

 I understand

7. I understand that this study has been reviewed and received ethics clearance through the University of Windsor Research Ethics Board. If you have questions regarding your rights as a research subject, contact:

Research Ethics Co-ordinator Telephone: 519-253-3000, # 3916
University of Windsor E-mail: ethics@uwindsor.ca
Windsor, Ontario
N9B 3P4

 I understand

Click here to indicate that you voluntarily consent to participate in the research project.

Appendix B: Web Login Page

UNIVERSITY of WINDSOR

onality Research

Michelle Carroll
Department of Psychology

Project Title: Moderators of the relationship between Personality and Maladaptive Behaviour

Principal Investigator: Michelle-Renée Carroll
Faculty Sponsor: Stephen Hibbard, Ph.D.

For this study you are asked to complete a number of questionnaires pertaining to how you act and your beliefs about yourself and your interpersonal behaviour. While this site is as user-friendly as possible, completing these questionnaires is time-consuming and may take you a few hours. Please try to complete all of the questionnaires in one sitting. It is important for the validity of the findings that you be in the same state of mind (i.e. mood) when completing all of the questionnaires. However, you may not have time to complete all of the questionnaires at once or may experience technical difficulties or have unexpected interruptions. For these reasons, this website was developed so that you may return to the login page and continue to complete the questionnaires on more than one occasion. This website is set up so that you have one week to complete all of the questionnaires before your Username and Password expire.

If you need to comeback to any of the questionnaires, return directly to this login site and click on the link for the questionnaire where you left off.

If you have any problems completing the questionnaires or would like more information about this study please go to http://www.uwindsor.ca/personality and click on the Help completing the questionnaires link in the Table of Contents or contact the primary investigator (Michelle Carroll) via e-mail at any time at mcarroll46@cogeco.ca.

You are also free to review the consent form that you must submit at the beginning of the study at any time by clicking on the this link: Consent form

Many of the questions within and across the questionnaires are similar to one another. It is very important for the accuracy of the results of this study that you answer all of the questions as truthfully as possible. Also, please complete the questionnaires in the order that they appear in the table of contents.

Thank you for participating in this research,

Michelle Carroll

Please Enter the following information:

Please enter your id:

Password:

Appendix C: Web Status Page

UNIVERSITY of WINDSOR

onality Research

Michelle Carroll
Department of Psychology

Our database shows that the following information has been completed by you. 0% are marked with "X" and therefore means you have not completed that questionnaire.

Participant:me
This session was activated on : Monday July 1, 2002
Your session will expire on:Tuesday October 8, 2002

N.B. Please complete the questionnaires in the order that they appear in the status table. Also, when saving the questionnaires, only click on the "save" button once. Sometimes it may take a few seconds before the status page reappears.

Section	Status	Completed (%)
Consent Form	✖	0%
Questionnaire 1	✔	5%
Questionnaire 2	✔	1%
Questionnaire 3	✔	10%
Questionnaire 4	✔	2%
Questionnaire 5	✖	0%
Questionnaire 6	✖	0%
Questionnaire 7	✖	0%
Questionnaire 8	✖	0%
Questionnaire 9	✖	0%
Questionnaire 10	✖	0%
Questionnaire 11	✔	8%
Questionnaire 12	✔	5%
Questionnaire 13	✖	0%
Questionnaire 14	✔	50%
Log-off		

Please e-mail the primary investigator (mcarroll46@cogeco.ca) once you have completed the study to receive a more detailed description of the study and to confirm that your bonus marks have been submitted to the participant pool.

Appendix D: Introduction to Website

For this study you are asked to complete a number of questionnaires pertaining to how you act and your beliefs about yourself and your interpersonal behaviour.

There are two main Web pages associated with this study. This site allows you to access information about the purpose of the study and provides detailed information about how to complete the questionnaires. At the top left-hand side of this page there is a Table of Contents. This page is the "Introduction". You can click on the second entry labelled "Help completing the questionnaires" to get more detailed instructions on how to login to the site, enter your data and use the frames created to help you complete the questionnaires.

While this site is as user-friendly as possible, completing these questionnaires is time-consuming and may take you a few hours. Please try to complete all of the questionnaires in one sitting. It is important for the validity of the findings that you be in the same state of mind (i.e., mood) when completing all of the questionnaires. However, you may not have time to complete all of the questionnaires at once or may experience technical difficulties or have unexpected interruptions. For these reasons, this website was developed so that you may return to the login page and continue to complete the questionnaires on more than one occasion. This website is set up so that you have one week to complete all of the questionnaires before your Username and Password expire.

If you need to come back to any of the questionnaires, return directly to the login site and click on the link for the questionnaire where you last left off.

To get to the login site from here, click on the "Go to Survey" link in the upper left-hand corner of this page or go to http://www.uwindsor.ca/personality/login

If you have any questions about this site or problems completing the questionnaires contact the primary investigator (Michelle Carroll) via e-mail at any time at mcarroll46@cogeco.ca.

Many of the questions within and across the questionnaires are similar to one another. It is very important for the accuracy of the results of the study that you answer all of the questions as truthfully as possible. Also, please complete the questionnaires in the order that they appear in the table of contents.

Thank you for participating in this research,

Michelle Carroll

Appendix E: Help Site

Help completing the questionnaires

This Web site has been developed to be as user-friendly as possible. There are fourteen questionnaires and a consent form that must be completed. It will take approximately two hours to complete all of them but you can "log out" and return at a later time to complete the study in its entirety.

Logging into the site

You will have received a Username and a Password which enable you to login as often as you'd like within a period of time to complete all of the questionnaires. Please ensure that you log out whenever you leave your computer so that unauthorized individuals do not alter your responses.

You "activate" your session the first time you log in. From that point you have seven days to complete all fourteen questionnaires. After seven days your session will expire and you will not be able to log in again.

The Status Page

A status page will appear after you have logged in. The page appears similar to the picture shown below.

Our database shows that the following information has been completed by you. 0% are marked with "X" and therefore means you have not completed that questionnaire.

Participant:tester
This session was activated on : Wednesday February 20, 2002
Your session will expire on:Wednesday February 27, 2002

Click here to answer Questionnaire 1

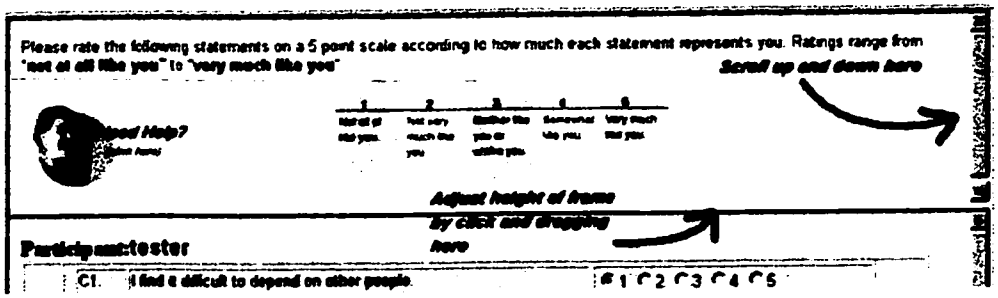
Section	Status	Completed (%)
Consent Form		100%
Questionnaire 1		39%
Questionnaire 2		11%
Questionnaire 3		83%
Questionnaire 4		25%
Questionnaire 5		33%
Questionnaire 6		6%

The status page allows you to select which of the fourteen questionnaires you'd like to fill out. You just point to the Questionnaire in the list and click on the link.

You'll also notice a status column to the right of the questionnaire link and a column showing the number of questions completed for that questionnaire expressed as a percent. Your status will change to a "thumbs up" picture when you have answered all of the questions.

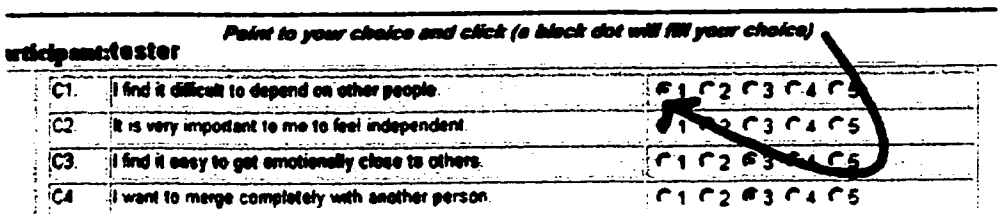
The Questionnaire - adjusting the frames

The questionnaires is divided into two frames. The top frame contains instructions and a legend that you will use to answer the questions that appear in the bottom frame. You can scroll up and down through either frame by using the scroll bar to the right of the frame. You can also adjust the size of the frames by "clicking" on the bar that separates the two frames and, while holding the button down, drag your mouse up or down. Release the button when you have resized the frame to the desired size.



Selecting your responses

Use your mouse to move the cursor over the radio button that is to represent your answer. Then click the left button. A black dot will remain inside the circle to indicate your selection. If you change your mind just repeat the process to select a different choice. The black dot will move to your new selection.



The last questionnaire

In the last questionnaire, you are asked to provide some information about yourself such as the number of years you have completed in school. You can click on the blank boxes and type out your answer using your keyboard.

Appendix F: Purpose of the Study/ Debriefing

Purpose of the Study

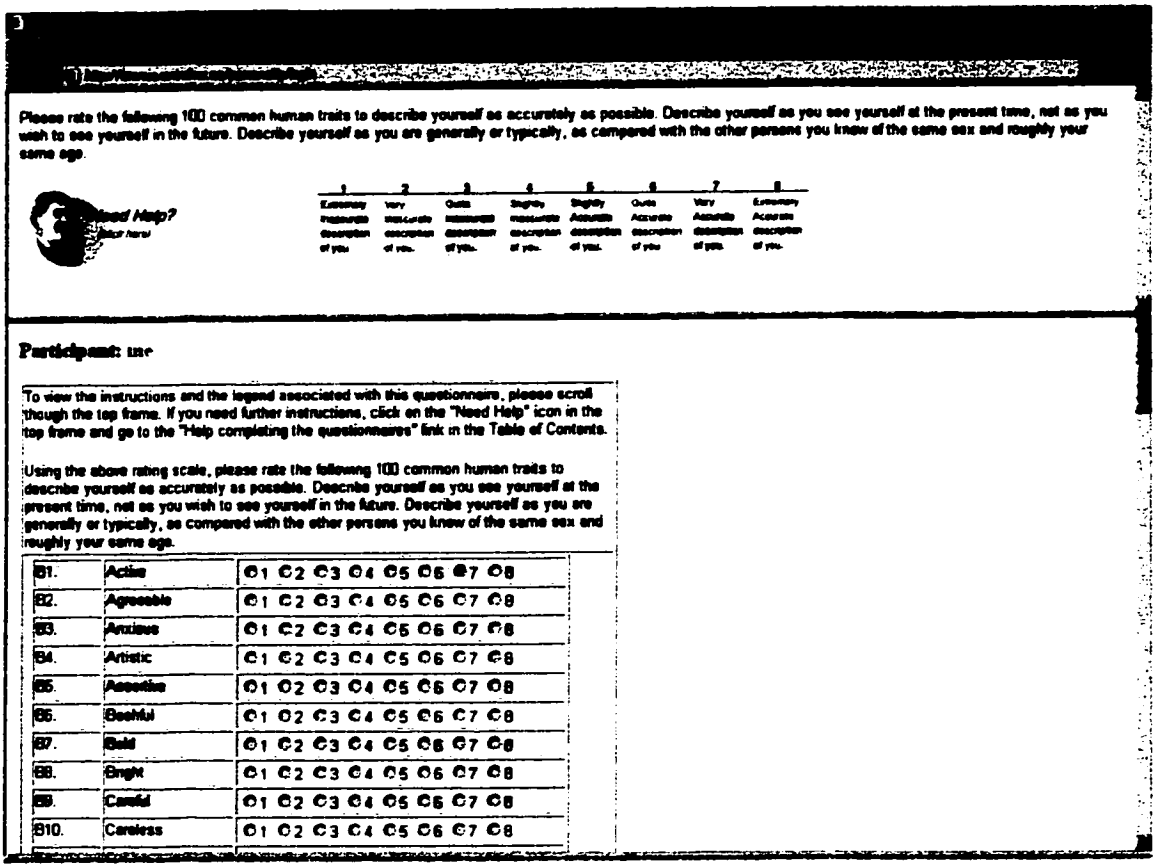
The purpose of the study is to investigate relations between different personality variables, interpersonal events and maladaptive behaviours. It is very important that you complete the study as truthfully as possible so that any relationships between the variables can be properly ascertained. The data collected in this study will be used to test many hypotheses. The primary reason is to ascertain whether or not a particular personality questionnaire is a good predictor of maladaptive behaviour or if other measures, such as measures of interpersonal events contribute to the prediction of maladaptive behaviour.

Please e-mail the primary investigator once you have completed the study to receive a more detailed description of the study and to confirm that your bonus marks have been submitted to the participant pool.

Thanks,

Michelle Carroll
primary investigator
M.A. Candidate, Adult Clinical Psychology
Department of Psychology
mcarroll46@cogeco.ca

Appendix G: Example of Web-based Questionnaire



Please rate the following 100 common human traits to describe yourself as accurately as possible. Describe yourself as you see yourself at the present time, not as you wish to see yourself in the future. Describe yourself as you are generally or typically, as compared with the other persons you know of the same sex and roughly your same age.

Need Help?

1 Extremely Inaccurate description of you
2 Very Inaccurate description of you.
3 Quite Inaccurate description of you.
4 Slightly Inaccurate description of you.
5 Slightly Accurate description of you.
6 Quite Accurate description of you
7 Very Accurate description of you.
8 Extremely Accurate description of you.

Participant: me

To view the instructions and the legend associated with this questionnaire, please scroll though the top frame. If you need further instructions, click on the "Need Help" icon in the top frame and go to the "Help completing the questionnaires" link in the Table of Contents.

Using the above rating scale, please rate the following 100 common human traits to describe yourself as accurately as possible. Describe yourself as you see yourself at the present time, not as you wish to see yourself in the future. Describe yourself as you are generally or typically, as compared with the other persons you know of the same sex and roughly your same age.

B1.	Active	C1 C2 C3 C4 C5 C6 C7 C8
B2.	Agreeable	C1 C2 C3 C4 C5 C6 C7 C8
B3.	Anxious	C1 C2 C3 C4 C5 C6 C7 C8
B4.	Artistic	C1 C2 C3 C4 C5 C6 C7 C8
B5.	Assertive	C1 C2 C3 C4 C5 C6 C7 C8
B6.	Bashful	C1 C2 C3 C4 C5 C6 C7 C8
B7.	Bold	C1 C2 C3 C4 C5 C6 C7 C8
B8.	Bright	C1 C2 C3 C4 C5 C6 C7 C8
B9.	Careful	C1 C2 C3 C4 C5 C6 C7 C8
B10.	Careless	C1 C2 C3 C4 C5 C6 C7 C8

Vita Auctoris

Michelle-Renée Carroll was born in Toronto, Ontario, Canada in 1976. She obtained a Hons. B.Sc. in Psychology at the University of Toronto in 2000. She is currently a candidate for the Master's degree in Clinical Psychology. She will graduate with her M.A. in the Fall of 2002 and will continue her education at the Ph.D. level at the University of Windsor.